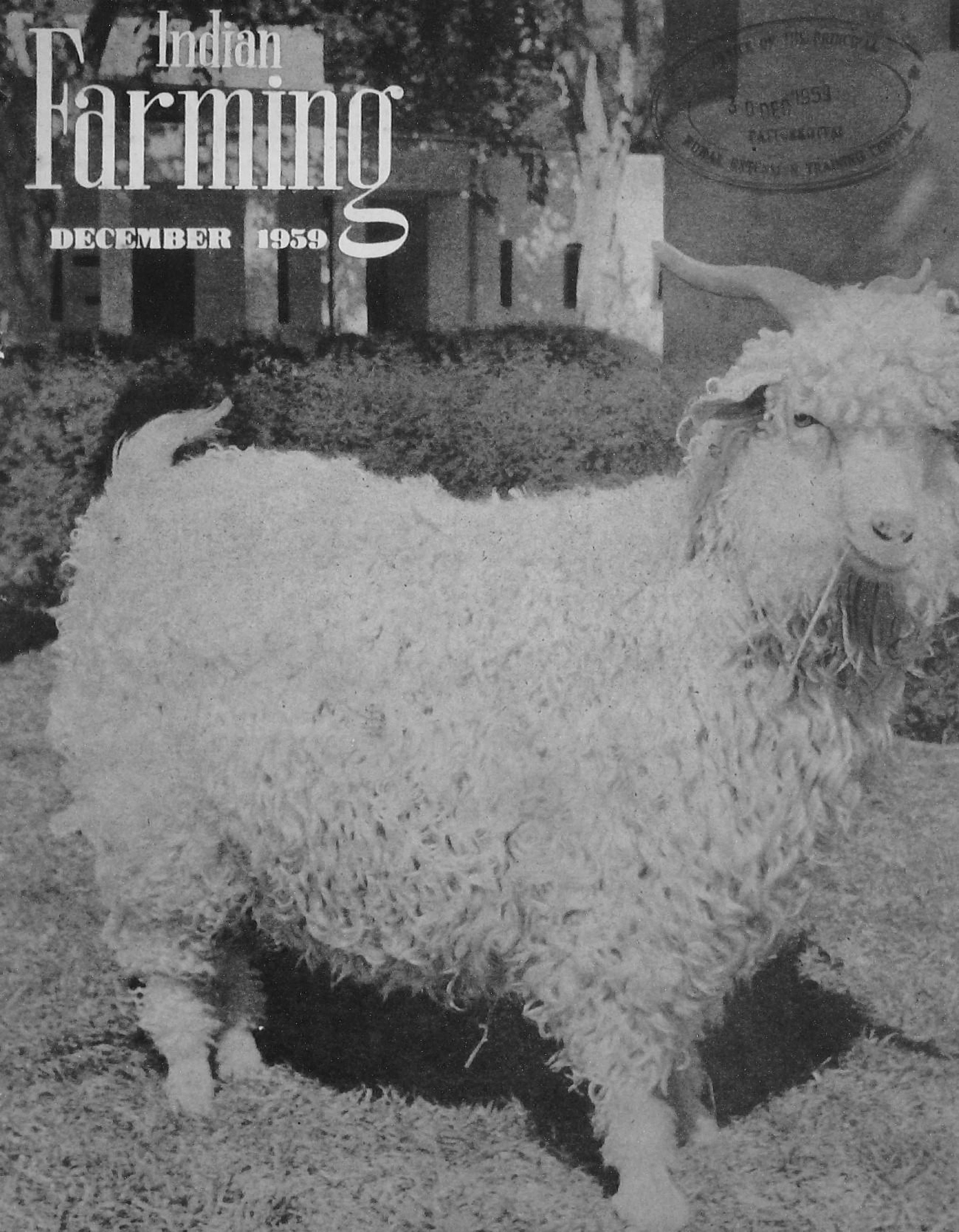
Indian Farming

DECEMBER 1959



OFFICE OF THE PRINCIPAL
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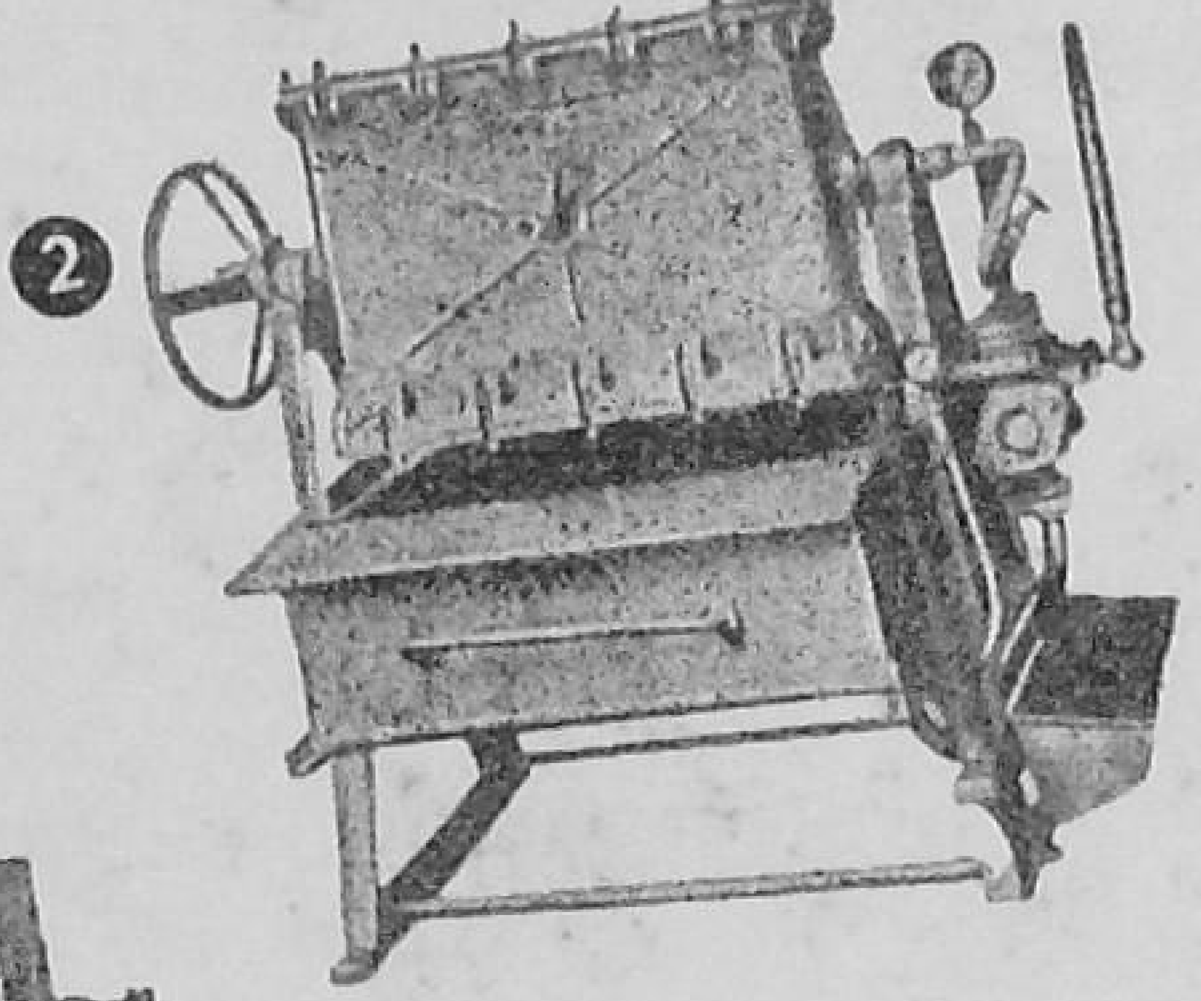
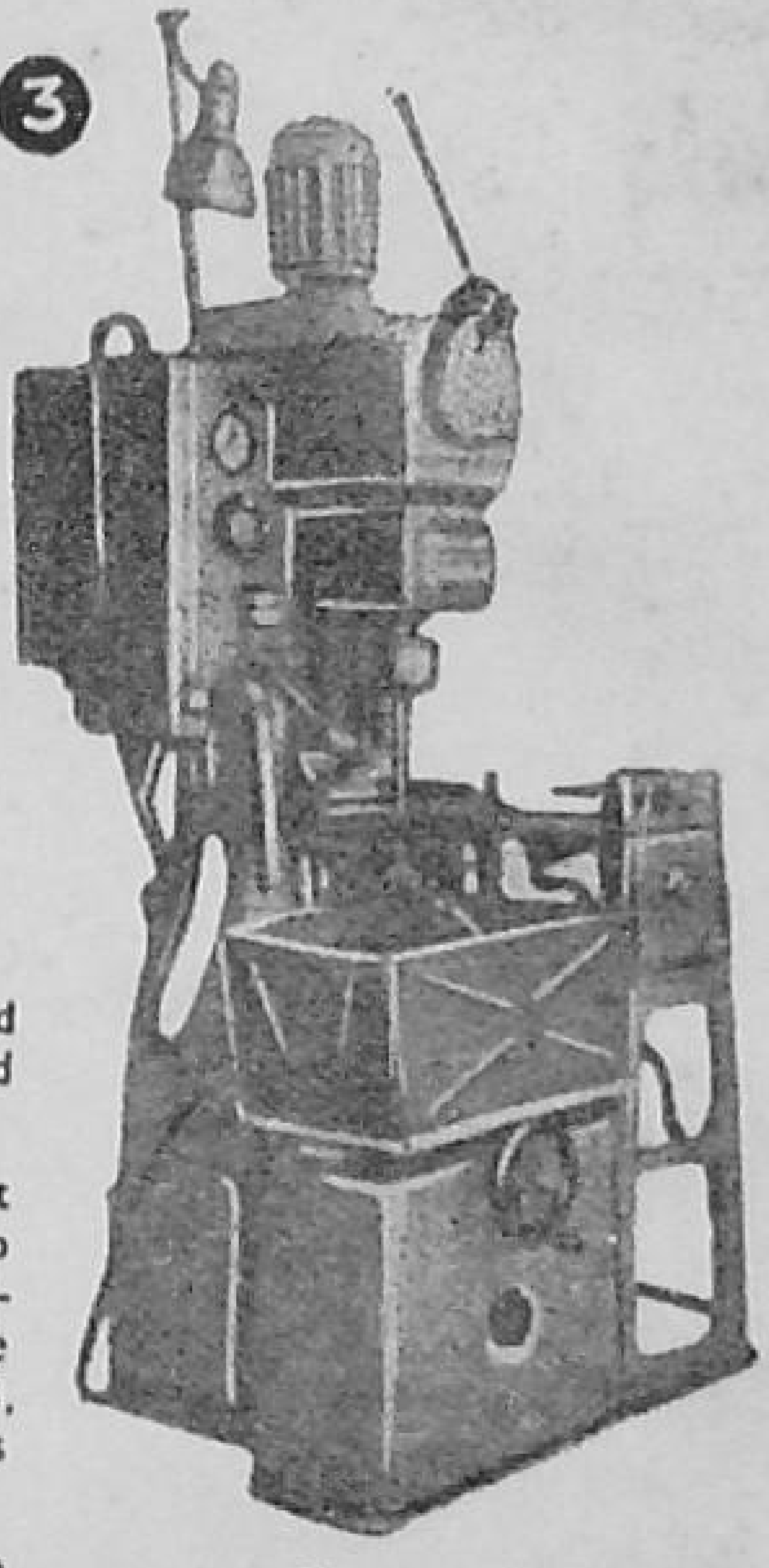
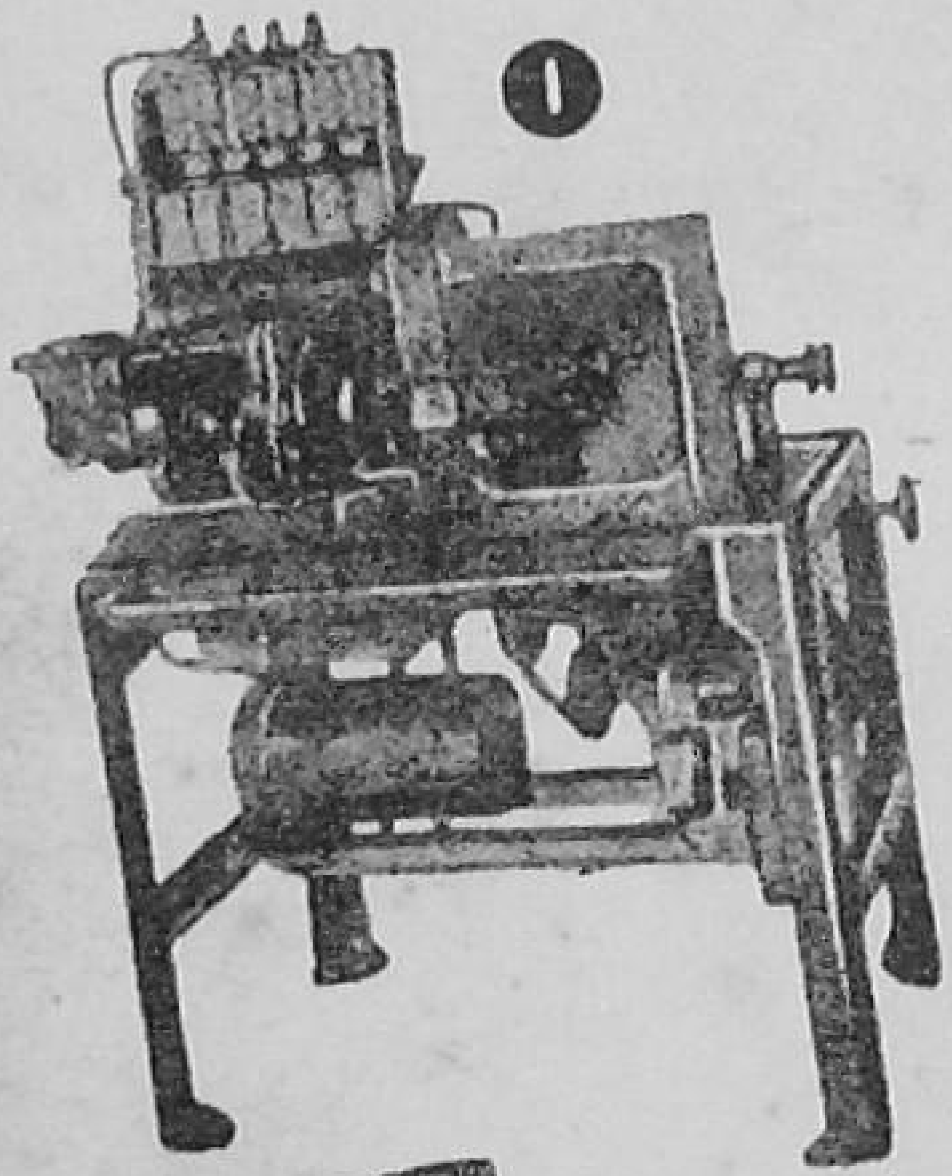
RURAL EXTENSION TRAINING CENTRE

EQUIPMENT
FOR CAREFUL HANDLING OF TRACTORS AND AUTOMOBILES







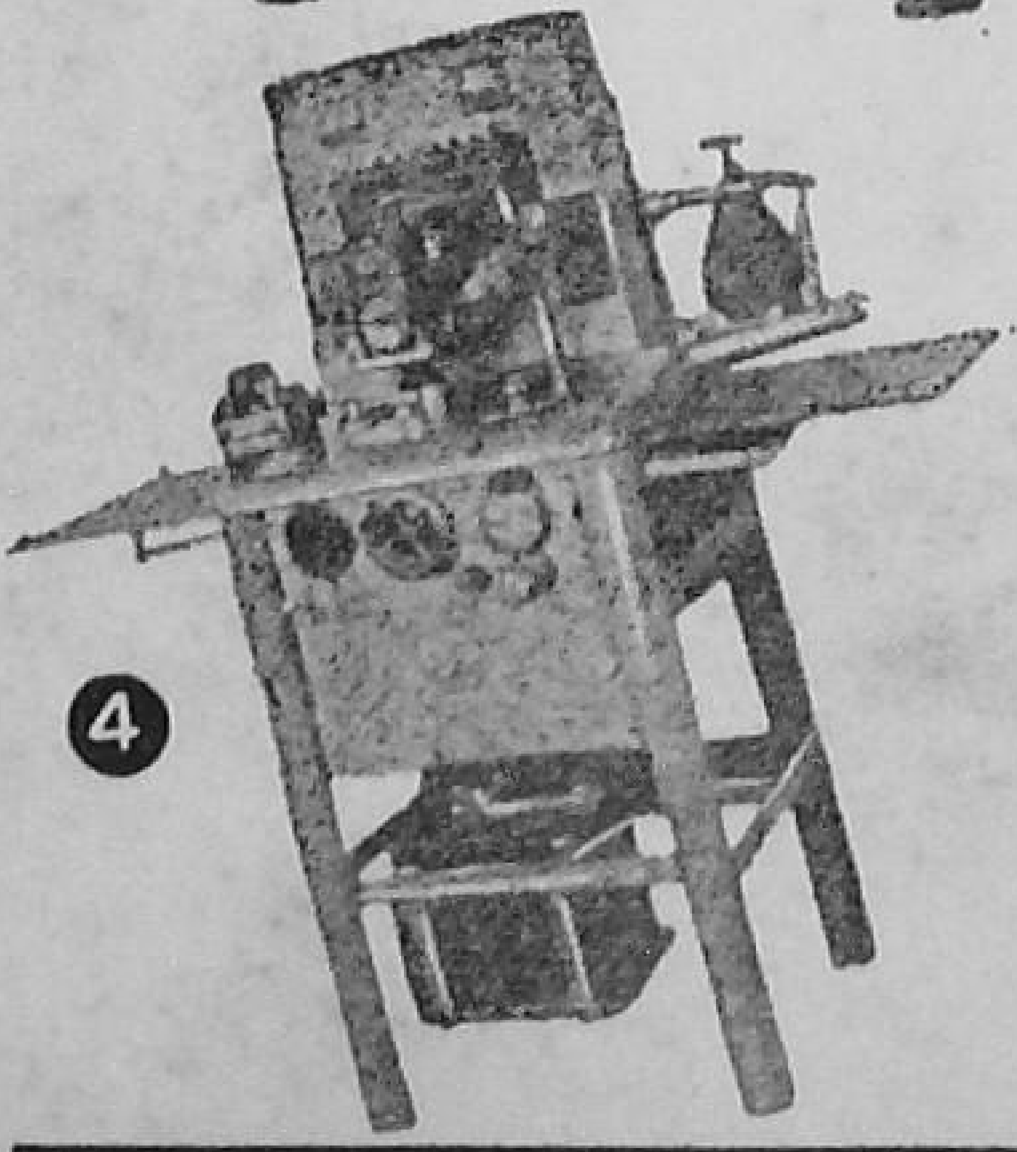


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Photo by H.K. Gorkha

Indian Farming

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ATTUKKOTTAI
EXTENSION TRAINING CENTRE

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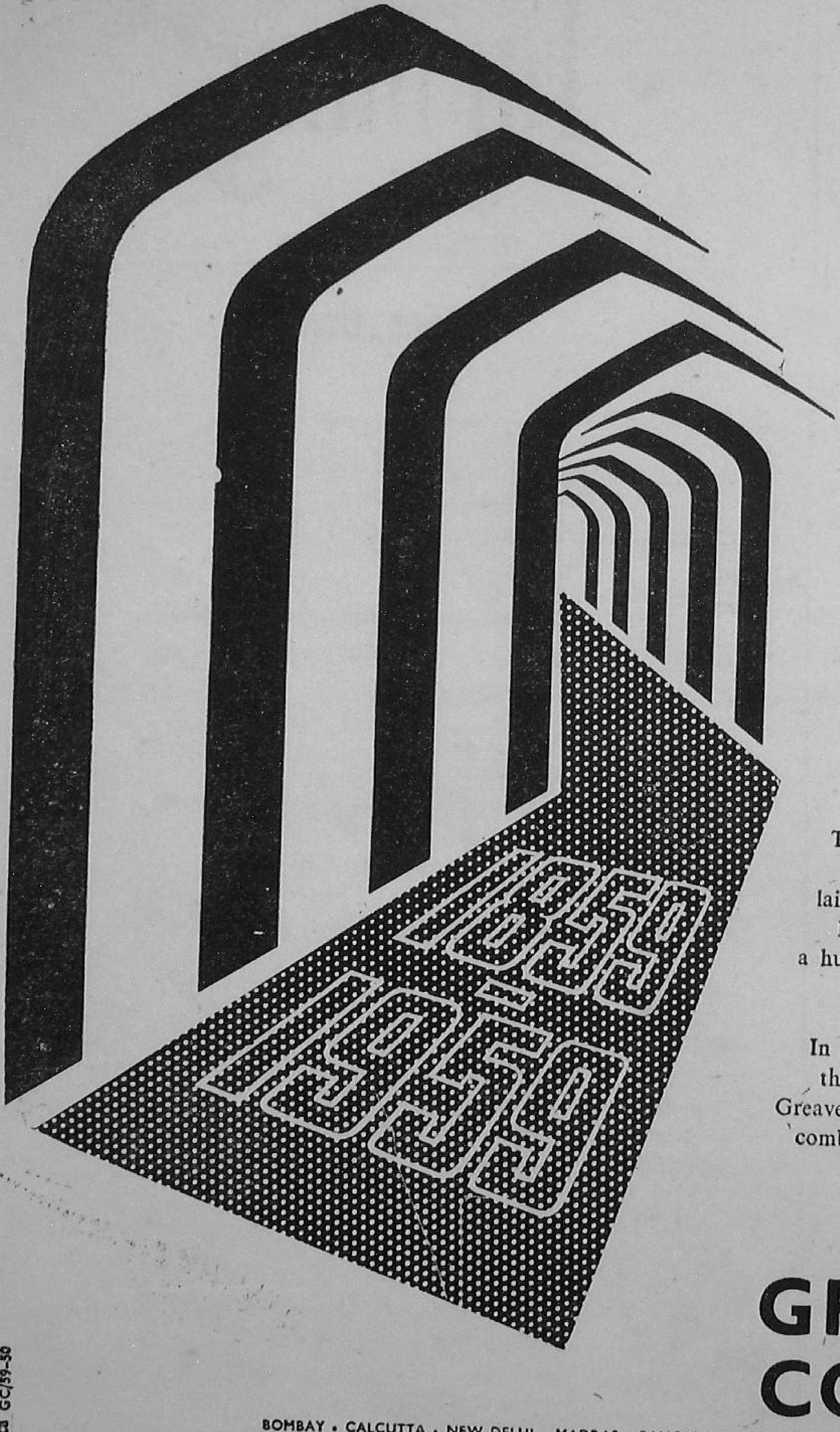

A Century of Progress...

The passage of time has shown that the foundation laid by James Greaves and his partner George Cotton a hundred years ago was well and truly laid.

In this hundredth year of their foundation the House of Greaves represents a happy combination of Indo-British cooperation.

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THE FLOW OF AGRICULTURAL KNOW-HOW

THE World Agriculture Fair now being held in New Delhi is the first big attempt to exhibit the advancement in the field of agricultural science on an international scale.

The time has arrived when the exchange of scientific knowledge and technical know-how in the field of agriculture across national frontiers has become extremely essential.

The economic strength of any country in the modern age is dependent upon the degree of modernization of its agricultural practices and overall production. The smaller and agriculturally backward nations have therefore to be brought in line with the advanced ones. And to achieve this, the gap in agricultural know-how between the advanced economies and those which are less developed has, therefore, to be bridged. The problem is in no way less urgent than the flow and spread of industrial know-how. The importance of agricultural development is gradually being recognized by all countries of the world.

It follows that such international meets as world farm fairs can best serve their purpose by stressing the importance of the flow of agricultural knowledge from the advanced farming communities to those that are still dependent on old methods and implements.

The holding of the World Agriculture Fair at New Delhi is a big step in that direction. A visit to the various pavilions erected in the Fair gives a complete picture of the recent strides made in different countries in the fields of agriculture, animal husbandry, horticulture, forestry, plant protection, soil conservation, agricultural machinery, fertilizers, agricultural marketing, etc. Here is a great opportunity for workers in the fields of agricultural extension, education and research and also those connected with the Department of Community Development and allied departments concerned with the progress of rural India to get to know what has been achieved in the sphere of agriculture not only in this country but all over the world.

Since the main purpose of the fair is to tell the farmers about the new farming techniques, it is hoped that attempts will be made to encourage and bring as many farmers as possible to the fair to enable them to have a grasp of the improvements made in the fields of agricultural and allied sciences in this country and abroad.

TO AUTHORS

Articles are invited on agriculture, animal husbandry, dairying, horticulture, soil conservation, plant protection, agricultural implements and machinery, fertilizers, etc., for publication in *Indian Farming*. Contributions will also be accepted for the various features published in the journal, *viz.*, Man of the Month, The Rambler Reports, What's New in Farming, Farming Elsewhere, The Farmer's Point of View, The Farm Home, etc.

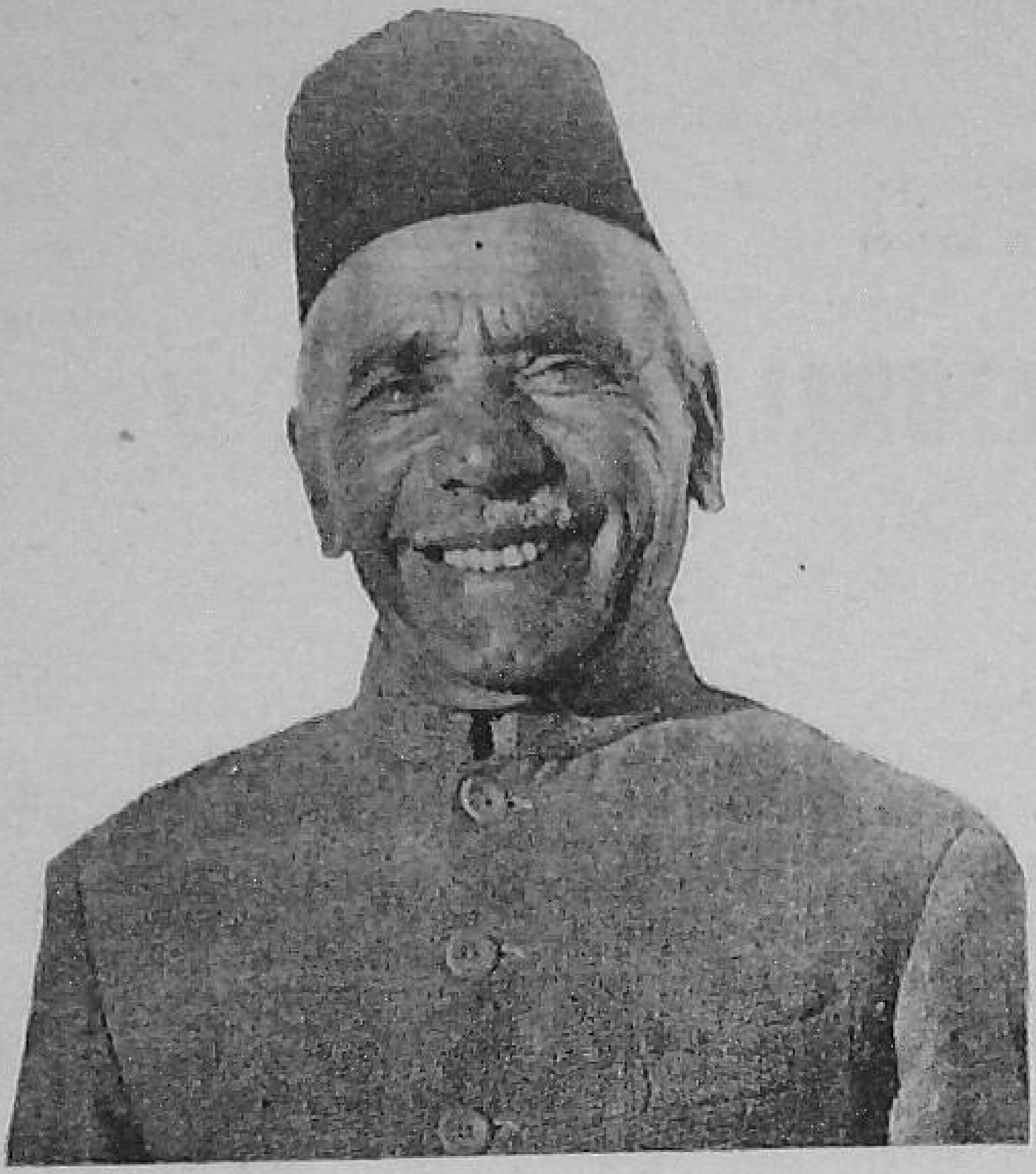
Articles should be informative, interesting and based on the findings of latest results of research. They should be brief, written in a simple, non-technical language and of practical utility to the farmers.

As far as possible, articles should be accompanied with suitable sketches, diagrams and photographs. In case these are not available, authors may submit pencil drawings of implements, agricultural operations, etc., so that suitable sketches could be made by our Art Section.

Cartoons pertaining to agricultural and rural life are also welcome.

All accepted contributions will be suitably remunerated.

—Editor



Manohar Das Sirkek

Sirkek Wins "Udyan Pandit" Award For Best Apple Orchard

by
Harkirat Singh

THE apple-growing industry in the country now has its first "Udyan Pandit". He is Shri Manohar Das Sirkek, owner of "Gopalpur Orchards and Nurseries" of Kotgarh in Himachal Pradesh. He has been selected for the award of this Certificate for 1959 for the best apple orchard by the Indian Council of Agricultural Research on the basis of an all-India competition..

Manohar Das, whom I interviewed a few days back, summarized his success story to me in two sentences: "Adventure prompted me to take up apple-growing at this unusual site. I put methodic and hard work into it and made it a highly paying proposition." A visit to his orchard would convince anyone of the truth of this statement.

MONEY FROM WILD PEARS

"It all started way back in 1925 when the break up of our joint family forced me down to this difficult place—more or less a waste growing nothing but weeds and wild pears—to fend for myself," said Manohar Das. "The very first need, therefore, was to have some immediate income." He topworked all the wild pears with improved varieties and, in fact, it was the attractive income he got from this, he added, that set him a-thinking. And that ishow the idea of laying out an apple orchard was born. The very uneven slope of the place and the serious threat posed by the somewhat unfavourable climate and attacks of pests and diseases at this low altitude could not deter him. "Some even laughed to my face when I mentioned the plan to them, but that was because nobody had cared to explore this prospect before," he added calmly.

THE COMPETITION PLOT

The 1½ acre competition plot that brought Manohar Das this coveted all-India distinction, is situated at an altitude of about 5,500 feet, about 2½ miles down the

The youngest son, Gian Parkash, is the "grafting expert" of the Gopalpur Orchards. His average is 500 grafts a day

Thanadhar bus stand. The soil is clay-loam, and the fields are terraced along the contour. Nullahs on the eastern and western sides and retaining walls on the others serve as fencing.

The trees were planted in March, 1950, by the triangular or hexagonal system with a spacing of 32 feet and trained by the "modified" leader system. The varieties grown were Royal Delicious, Red Delicious, Richards Red and Golden Delicious (as pollinator). This 1½ acre plot yielded its first commercial crop—four maunds of fruits in 1956.

RISING YIELDS

In 1957, the yield was 20 maunds ; it would have been more if the temperature had not dropped suddenly during the bloom period. In 1958, production rose to 85 maunds, and this year it was nearly 175 maunds.

Detailing the various operations adopted, Manohar Das explained to me that well-rotted farmyard manure at two to 2½ maunds per tree was applied every alternate year with the last digging up of basins during December. "I would like to give even more, but the pity is that the supply is insufficient," Manohar Das told me. That was why, he emphasized, he was using ammonium sulphate at 2¼ pounds per tree in a single dose every March, and superphosphate at one pound per tree to improve the colour and keeping quality of the fruits, when it started bearing.

NO IRRIGATION

The plot was never irrigated, but to conserve soil moisture, about three inches of thick grass mulch was provided after the digging of basins in March. "Not only is moisture conserved in this way, but also the fruits do not get bruised in case they drop," Manohar Das informed me. After the first monsoon shower in June, the grass mulch was mixed with the soil and sannhemp sown for green manuring. From this year he proposes to use cover crop of sannhemp as mulch. He also intends to introduce clover as cover crop and to adopt the permanent sod plus grass mulch system of management. He will thus have a permanent cover crop in-between the trees, and will use cuttings from the clover as additional mulch in the basins of the apple trees.

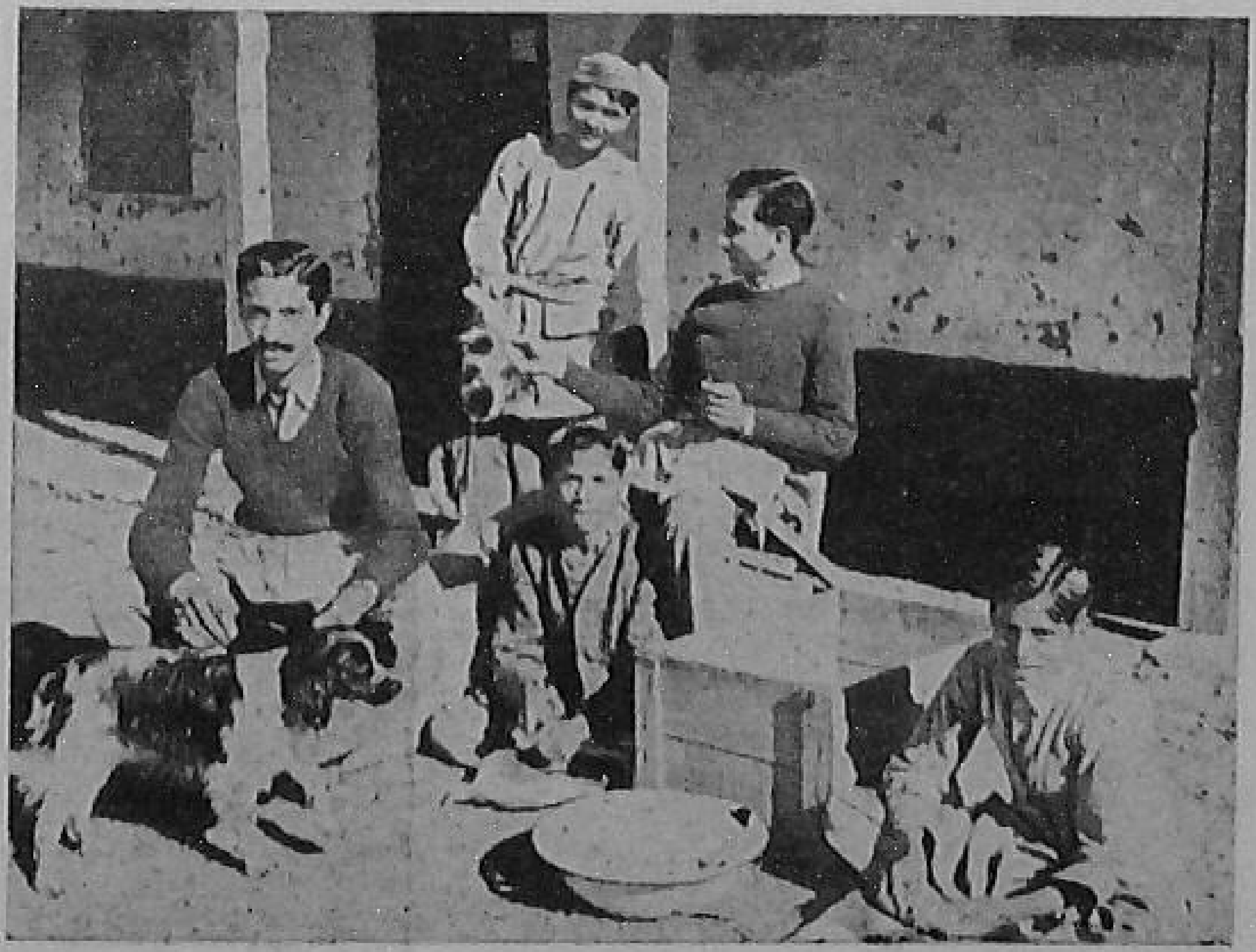
CONTROL OF PESTS AND DISEASES

This is how he checks pests and diseases. Two sprays, one of an insecticide and the other of a fungicide, i.e., diesel oil emulsion three per cent as dormant spray during December and some copper or sulphur preparation during March, every year. One cover spray of "Dieldrex 18 E.C." during May or June for controlling the beetle attack and for checking the active San Jose scale. Soaking the soil near the base of trees with "Dieldrex"—an ounce in half a gallon of water, to fight the root borer. Swabbing the trunks of trees in March and at the end of June with Bordeaux paint mixed with "Dieldrex" to ensure safety from trunk borers and other caterpillars. Manohar Das uses zinc phosphide to kill rats. Petromax lamps and crackers help in scaring away bats at night. "And, my gun to shoot bears, who, in addition to apples sometimes lick away all the honey from the beehives," put in Manohar Das good-humouredly, pointing to a few bear-skins lying in the compound of his house.

"I consider this new honour as the best fruit of my labour," said Manohar Das, visibly pleased with his achievement. "But please don't go away with the idea," he added, hastily, "that this would be the end of my efforts. Not at all. Rather, this is the real beginning for me, and I have lots of plans for the future."

Grafted plants of the latest American varieties—Starks Red Gold, Jon-A-Red, Scarlet Staymared and Winesap Virginia—ready to be planted out in the orchard

Extracting seeds from fruits found unsuitable for commercial purposes



A sure way of raising a good crop in lands available late in the season

Practise Transplanting For Late Crop Of Wheat

by

P.C. Raheja *and* **B.P. Mathur**

Indian Agricultural Research Institute
New Delhi

EVEN those farmers who are late in sowing wheat can now hope to get high yields, if they raise their crops by the transplanting method.

It has been observed that while most of the fields in northern India, where wheat is one of the most important crops, are sown in time, about 10 to 15 per cent of the area containing much fertile land having irrigation facilities, is unavoidably sown late. Sometimes it is due to late harvest of *kharif*, when very little time is left in-between the two seasons for preparing the land.

Under such conditions, wheat crop sown late in December makes poor growth due to the cold weather prevailing during December-January. Thereafter, there is an abrupt rise of temperature in the later part of the season, which leads to rapid maturity of the late-sown crop.

To overcome the disadvantages of late sowing of wheat crop and to give it an early start by first raising seedlings in the nursery and then transplanting them in the field, trials were conducted at the Indian Agricultural Research Institute in the *rabi* of 1958-59.

In finely-prepared land, raised nursery beds eight feet by four feet were made. Irrigation channels were provided all round. Well-decomposed farmyard manure at the rate of ten tons per acre was applied and thoroughly mixed with the top three inches of the soil.

Seed was broadcast at the rate of 20 pounds per 1/20th acre and mixed with the moist soil of the bed with the help of a *khurpi*. The nursery was sown at four different timings, *i.e.*, on the 18th October, 2nd November, 3rd December and 18th December, so as to cover the early, mid-season and late periods. The variety used was *N.P. 718*.

The field selected was a water-logged one but was free from its effects by mid-November. It was ploughed and cultivated to bring it to proper tilth. To compare the yield of transplanted wheat and normally-drilled wheat, late sowing was done on the 3rd Decem-

The drill-sown crop of wheat gave 18.4 maunds per acre

ber. The seedlings were transplanted in rows nine inches apart, the distance between plants being six inches. In each hole, two to three seedlings were transplanted. Seedlings raised in 1/20th acre were sufficient for transplanting one acre.

The October and November-raised seedlings had developed two to five tillers when they were transplanted. Some of these tillers died after transplanting. Those transplanted on the 3rd and 18th January had, on an average, one to two tillers in the case of 30 day-old seedlings, and two to three tillers in the case of 45 day-old seedlings. The seedlings in the nursery made much better growth than the plants drilled direct in the field.

The seedlings transplanted on 3rd December and 18th December took less time to develop roots and started tillering faster than those transplanted on the 3rd and 18th January.

The crop was irrigated on the 17th January. Heavy rain was received on the 27th January, after which the crop did not require any more irrigation; as there was sufficient moisture in the soil.

Just before the first irrigation, ammonium sulphate was broadcast at the rate of 150 pounds per acre and mixed with the soil by hoeing. While broadcasting the fertilizer, care was taken to spread it in-between the rows of wheat to avoid contact with the foliage of the plants. This practice resulted in automatic weeding of the field, the undesired plants being destroyed by the contact of the fertilizer.

The performance of field-sown and transplanted crops is summarized in the table given in the next column.

HIGH YIELD FROM TRANSPLANTED CROP

The late-sown crop drilled on the 3rd December gave only about 18½ maunds of grain per acre as compared to 30 maunds from the crop transplanted on the 18th December, when the seedlings were 45 days old. Even the crop raised from 30 day-old seedlings gave

Date of sowing the nursery	*Date of transplanting or sowing*	*Age at transplanting time (in days)*	*No. of tillers at transplanting time*	*No. of ear-bearing tillers at harvest time*	*Grain yield in mds. per acre*
2nd Nov.	18th Dec. (T)	45	4—5	11	30·1
2nd Nov.	3rd Dec. (T)	30	2—3	8	23·5
18th Oct.	3rd Dec. (T)	45	3—4	8	20·3
18th Nov.	3rd Jan. (T)	45	5—6	7	19·6
18th Nov.	3rd Dec. (T)	15	1	7	19·1
3rd Dec.	18th Dec. (T)	15	1	7	15·0
3rd Dec.	3rd Jan. (T)	30	1—2	4	11·8
3rd Dec.	18th Jan. (T)	45	2—3	4	11·1
—	3rd Dec. (S)	—	—	6	18·4

T = Transplanted S = Drill sown

five maunds more yield. Sowing the nursery on the 3rd December and transplanting the seedlings 15, 30 or 45 days later invariably yielded less than sowing direct in the field early in December.

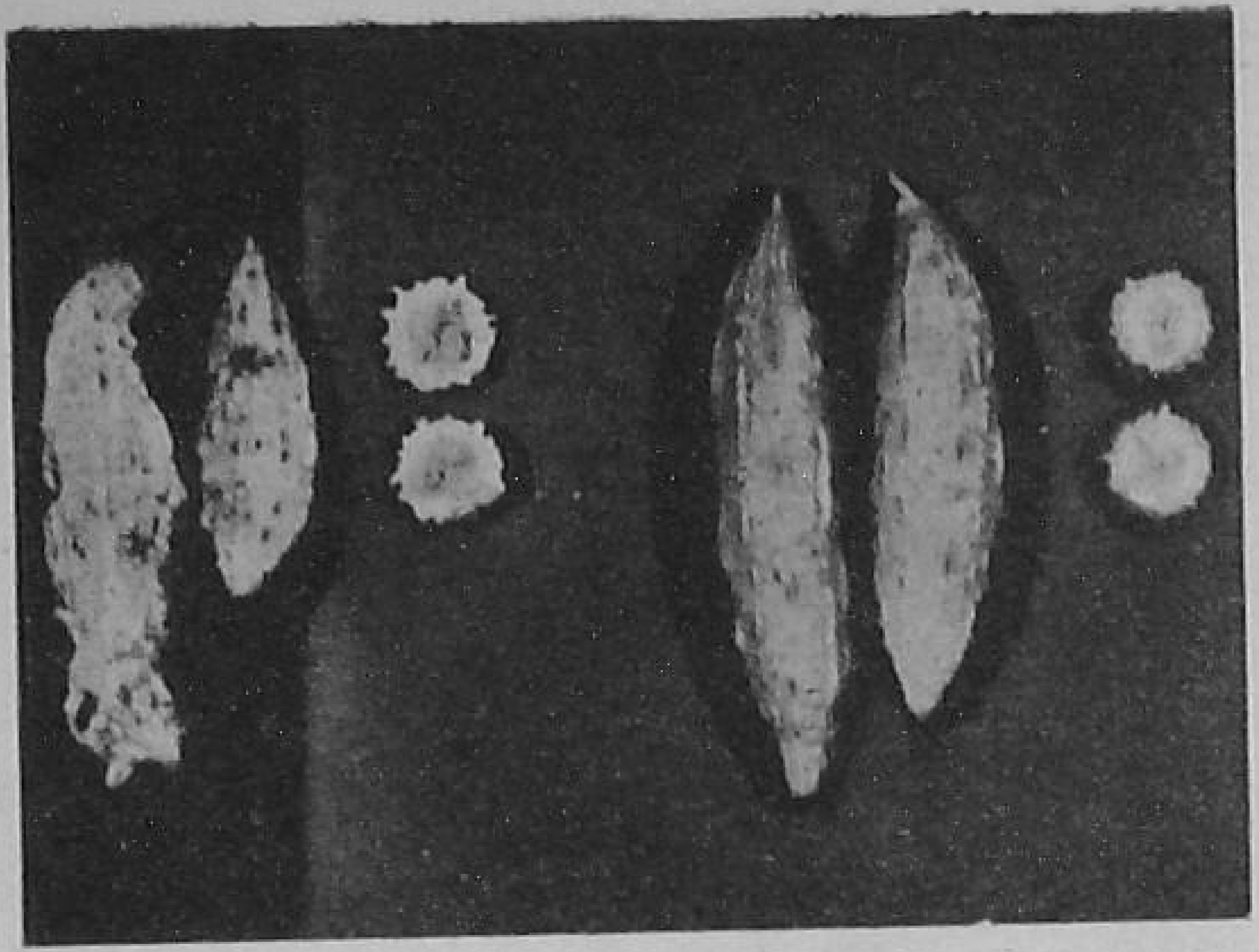
TRANSPLANTING PAYS

The additional cost of raising the nursery is very small. Transplanting is the only important item of expenditure, costing about Rs. 24 to 30, which can be easily compensated by the saving in seed required for sowing and the income from the extra out-turn of about 12 maunds of wheat.

Transplanting of wheat will be successful only where irrigation facilities are available. The transplanted crop can be top-dressed with 30 pounds of nitrogen in the form of ammonium sulphate or any other nitrogenous fertilizer. In water-logged areas which become available for cultivation late in the season, this is a sure way of raising a good crop.

This crop was transplanted on December 3, when it was 30 days old. It produced 23.5 maunds wheat per acre

guard your bitter gourd against the fruit fly



Infested fruits showing punctures and their cross-section view

Good fruits and their cross-section view

by

P. M. Srinivasan

Entomologist, Coimbatore

PUNCTURED skin, premature yellowing and decay of the fruits are the signals that the fruit fly, *Dacus cucurbitae*, is at work on your bitter gourd crop. If you open an infested fruit at this stage, you will see a number of maggots wriggling in the rotten pulp and jumping up.

Of the cucurbits, the bitter gourd, *Momordica charantia*, is the worst affected by fruit flies in South India. The female thrusts its cigar-shaped eggs into the fleshy portion of the fruits with its ovipositor (organ for depositing eggs) and covers up the puncture later with a sticky secretion. The maggots hatch out in about three days and feed on the pulp, gradually working themselves into the inner core as they develop.

Experiments with nicotine sulphate 0.1 per cent, "Endrin" 0.02 per cent and "Parathion" 0.025 per cent gave appreciable control of the pest. The insecticides were applied five times at intervals of about ten days starting from 1½ months of germination. The spraying of insecticides was started from the time the vines put forth flower buds and stopped sufficiently in advance of harvest. The few fruits that reached edible maturity early were picked before giving the insecticidal treatments.

According to the results obtained, the infestation was brought down from 30.7 per cent in the control plot (no treatment) to 9.7 per cent, 11.1 per cent and 14.2 per cent in the plots treated with nicotine sulphate 0.1, "Endrin" 0.02 and "Parathion" 0.025 per cent, respectively. The yield of fruits under the treatments is given below:

Treatment	*Average number of uninfested fruits in an area of 8 feet × 8 feet*	*Average weight (in lb.) of uninfested fruits in an area of 8 feet × 8 feet*
Nicotine sulphate 0.1%	261	16
"Endrin" 0.02%	397	22
"Parathion" 0.025%	337	21
Control (untreated)	141	8

It will be seen from the higher yield and weight of fruits in the treated plots that these insecticides controlled the pest effectively. Although "Parathion" 0.025 per cent gave good control of the pest, it is advisable to use insecticides like nicotine sulphate 0.1 per cent or "Endrin" 0.02 per cent. The latter particularly increases the yield of uninfested fruits by nearly three times that of the untreated plot.

The Plant That Gives Us Vanilla

The vanilla plant

by

P. K. Gopalakrishnan
Senior Assistant
Agricultural Research Station
Ambalavayal

and

M. Narayanan Nambiar
Superintendent
Wynad Colonization Scheme
Ambalavayal

THE increasing demand for vanilla has provided a great incentive to farmers who are now growing this aromatic orchid on a large scale.

The vanilla of commerce is an alcoholic extract manufactured from the cured parts of *Vanilla planifolia* or *V. pompona*. It is widely used for flavouring cakes, creams and confectionery.

Vanillin is the active principle in vanilla, and it is this which accounts for the aroma. Even though synthetic vanillin is available in the market, the consumers prefer the natural one.

The plant, a native of central America, was brought to India in the beginning of this century and was grown successfully in the lower regions of the ghats. However, its cultivation did not spread much and the plant remained unknown to most of the people for a long time.

Vanilla is a perennial climbing orchid. It thrives well in very humid regions receiving an average rainfall of 75 to 150 inches and at elevations of 1,500 to 3,500 feet. It is a forest-loving plant and requires the shade of lofty trees and thick shrubs. The soil should be light, friable and rich in humus. Sticky clayey soil with poor drainage is unsuited for the proper development and growth of this plant.

The plants have long, flexuous, succulent green stems which put out grey-white aerial roots opposite the leaves. The vines cling to the supports with the help of these roots. The leaves are oblong, succulent and bright green in colour, and the pod-like, fleshy capsules are six to nine inches long. The variety commonly grown in South India is *V. planifolia*. *V. pompona* is another good variety having a little bigger leaves.

The plant is mainly grown in South India, where it is confined to a few gardens at the foot of the Nilgiris and some farms in Wynad, including the Agricultural Research Station, Ambalavayal, where favourable climatic conditions for the proper growth of the plant exist.

PROPAGATION

Vanilla is propagated from stem cuttings which are about a foot in length and are planted either straightaway in the field near the supports or in the nursery for rooting. In about two weeks, the cuttings put forth fresh shoots from the leaf axils, which soon develop in length and produce aerial roots. It is advisable to take longer cuttings measuring three to four feet in length if planting material is available in plenty, as longer cuttings grow quickly and flower within a period of $1\frac{1}{2}$ years, while the smaller cuttings take about three to four years to flower.

The site selected for planting should have lofty forest trees about 15 to 20 feet apart, providing permanent shade to the plants. Pits 18 inches each way are dug in summer, giving a spacing of ten feet between the plants and six feet between rows. They are then filled with burnt earth.

With the approach of early monsoon showers, cuttings of suitable support plants are taken and planted five feet apart. The support plant must be a quick grower and should be sufficiently strong, producing branches at regular intervals, and should also suit the local conditions. In Wynad, *Jatropha* and *Plumeria* are found to be ideal supports for vanilla.

Where the soil is deficient in calcium, application of one pound slaked lime per pit while filling the pit has proved advantageous. Well-rotted cattle manure has been found to promote growth. The rooted cuttings are generally planted in June-July, during the south-west monsoon. The plants respond well to watering in summer. Mulching the basins of plants with chopped banana stumps and green leaves promotes growth.

Soon after planting, the shoots are tied loosely on to the supports and when they grow in length, they are trailed on horizontal bars which are placed on the notches of the support plants at a height of about $3\frac{1}{2}$ to four feet from the ground. The vines generally produce side shoots from the lower portion when the leader shoot grows to a certain length.

In Wynad, when all the branches were allowed to grow, flowering was found to be late and the yield was also less. When one shoot alone was allowed to grow, the vines made good growth, flowered early, and yielded well. However, it was found advantageous to allow two shoots to develop horizontally or hanging down in coils, one on either side of the vertical support, and to prune away the remaining shoots for fresh planting when they were about $1\frac{1}{2}$ to two feet in length. When the vines are sufficiently old, it is advisable to cut them off; they will be replaced by new shoots bearing more flowers.

In Wynad, flowering of vanilla starts in January and extends up to April. When the vines are watered in summer and the conditions are favourable, flowering starts much earlier, by about November. The flowers appear at the nodes in bunches of 15 to 20. On an average, a plant produces five to ten bunches in a season. The flowers require hand pollination to set pods. The flowers open early in the morning and the stigma remains receptive till evening, when the flowers close. Observations conducted at Wynad show that the optimum time for hand pollination is between 6 a.m. and 9 a.m. and 4 p.m. and 5.30 p.m. The flowers thus pollinated during the morning and evening hours recorded an average fruit set of 95 per cent.

The fruits that develop after self-pollination are green in colour and take 11 to 12 months to mature, when the tip of the pod turns light-yellow. If the pods are not harvested then, the yellowing extends slowly up to the base of the fruit. The pods should be picked when the yellowing is first noticed at the tip. At other places, pods are reported to mature in only four to five months from the date of flowering.

The harvested pods are cured by means of "sweating" which gives them the characteristic vanilla aroma. The cured pods are brittle, dark brown in colour and marketed as such in bundles. One hundred and eighty to 200 cured pods weigh one pound, valued at about Rs. 20/-. On an average, a well-grown plant produces 75 pods a year, and an acre of good vanilla crop gives an income of about Rs. 4,000 per year.

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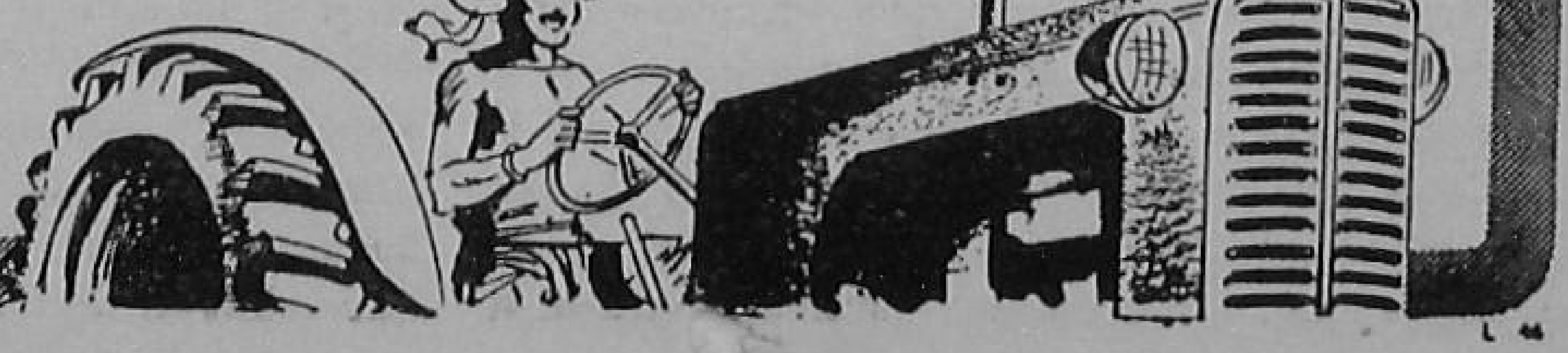


ALGAE

A SOURCE OF FOOD, FEED AND MANURE

Dr. B.P. Pal, Director, Indian Agricultural Research Institute, welcoming the scientists who participated in the International Symposium in Algology

AN international symposium on Algology, jointly organised by the UNESCO and the Indian Council of Agricultural Research was held at the Indian Agricultural Research Institute, New Delhi, from December 7 to 11, 1959.

Inaugurating the symposium, Shri S.K. Patil, Union Minister for Food and Agriculture, said that algae had been intimately connected with human beings from time immemorial, particularly in the fields of agriculture and industry. The miracle of algae was that they were potential sources of food, feed and manure.

Shri Patil said that attempts should be made to find out food plants which would cover all growing areas all the time, would use the maximum solar energy and would contain more of protein and fat and less of indigestible food than the kind of plants we use now. Algae were ideal plants from this point of view. By virtue of their capacity to synthesize food, it would be possible to get plenty of proteins, fats and carbohydrates from them.

He said that many sea-weeds were being used as items of food in a number of countries such as Malaya, parts of the Pacific Coast of the U.S.A., Burma, Siam, Borneo, Hawaii, Japan and China. Our country had a coastline rich in these sea-weeds and our scientists should step up their activities in harnessing these "treasures" to meet our demands. He said that sea-weed farms could be set up along our coasts, where the useful sea-weeds could be cultivated regularly.

He said that algae could also be used profitably as manure for increasing food production. The use of blue-green algae in the fixation of nitrogen in the soil was of great importance. These could be used in the reclamation of alkaline or *usar* lands.

Dr. M.S. Randhawa, Vice-President, Indian Council of Agricultural Research, and Additional Secretary, Ministry of Food and Agriculture, who presided over the symposium, said that the study of algae might give a clue to the right solution of the organizational and physiological problems met with in higher forms of life. Algae could also be used experimentally for studying the effects of radiation as well as chemicals, including fertilizers.

POTENTIAL SOURCE OF FOOD

He said, a noteworthy feature was that while in the case of cereals only the grain was eaten—the roots, stems and leaves being useless as human food—algae had none of these inedible structures. Further, unlike cereals, algae could be grown to supply food continuously throughout the year. He, however, admitted that much more research had to be carried out before algal food of acceptable palatability, produced at low cost, became available for human use.

Referring to the reclamation of alkaline *usar* soils, Dr. Randhawa said that in the Banthra Farm, near Lucknow, *usar* soils had been reclaimed by using blue-green algae. This possibility needed to be studied further. Algae provided the primary food for fish and other aquatic animals. The greatest fishing grounds of the ocean were found where algae were present in very large numbers in the form of plankton.

Dr. Randhawa pleaded for the setting up of a world collection of algae by the UNESCO. He said it was also desirable that a central collection of algal specimens be built up in each country, where all species described in that particular country could be preserved. In India, he said, an effort was already being made in this direction by developing such a collection at the Algae Laboratory of the Indian Agricultural Research Institute.

The symposium, which lasted five days, was addressed amongst others, by Prof. M. O. P. Iyengar, Dr. H. Tamiya and Dr. G.E. Fogg.

SAVE YOUR NEW-BORN CALVES

by

Gian Singh

Cattle Officer
Indian Agricultural Research Institute
New Delhi

In India, a large number of calves die every year due to the unscientific practices adopted for rearing them. In villages, the deaths are mainly due to lack of first-aid to the newly-born calves. In cities, the condition is still worse on account of acute shortage of space and indifference of the cattle owners to the rearing of young stock. In consequence, the calf mortality is astonishingly high.

This high rate of mortality is mainly due to three diseases, *viz.*, white scours or dysentery, navel ill and retention of meconium.

At the Indian Agricultural Research Institute, New Delhi, where a valuable pedigree herd of Sahiwal Cattle has been maintained since 1904, these three diseases have been successfully controlled by systematic medication and adoption of hygienic measures.

WHITE SCOURS

White scours or dysentery is the most serious of all the calf diseases and is caused by unhygienic conditions, *e.g.*, dirty floors, beddings, utensils and unclean handling. The mortality is as high as a hundred per cent in untreated cases. Its symptoms appear in about one to three days after birth. The calf stops taking milk, runs high temperature, looks depressed and remains lying down for most of the time. The faeces become fluid, yellowish and foetid, later on becoming foamy and occasionally blood-stained. The calf is reduced to a skeleton, with sunken eyes and rough coat, and dies within a week or so. Hitherto, the treatment consisted in administering purgatives, astringents and anodynes which took much time; nor was the cure certain. Even if some calves were saved, they remained weak and unthrifty.

The treatment now adopted for this disease is to isolate the calf and put it on sulphamezathine right from the start. Eight tablets (0.5 grams each) crushed and mixed in about half-a-cup of warm water are given as an initial dose, followed by half this quantity for the subsequent three days. If the calf resists oral administration, then eight c.c. sulphamezathine sodium solution (33⅓ per cent) is injected under the skin, followed by four c.c. for another three days.

Equally important is change of diet. Milk should be totally stopped and substituted by rice, oats or barley gruel (one seer of rice mixed with ten seers of water and boiled to make a semi-solid mass, with four *chattaks* salt and one *chattak* soda bi-carbonate added to it). Six *chattaks* of this gruel is given in the morning and repeated in the afternoon and evening. A majority of cases are found to respond to this course and get over the attack in about four days. If there is no improvement in the general condition of the calf on the third day, sulphamezathine is supplemented with one c.c. of penicillin in oil (three lakh units) injected on the third or fourth day in the muscle. This helps greatly in clearing the infection more or less completely. From the fifth day onwards, the calf is given gruel two times a day and milk for the third time. In the next two days, the gruel is replaced by milk. It is necessary to add a little sugar or *gur* in the milk to make it more nutritious and palatable, and a pinch of ginger to make it easily digestible.

NAVEL ILL

Navel ill infection occurs through the navel, a tube-like structure by which the calf is attached to the walls of uterus of the cow. The navel ruptures at the time of birth and its broken end being open, takes up the infection easily. The calf becomes dull, disinclined to move and stops taking milk. The temperature rises to about 105°F. The seat of the navel is swollen, hot and painful. If left unattended, the infection spreads to other parts of the body, especially the joints, when the chances of recovery become remote. The mortality is about 60 per cent.

This disease can be checked by more care during the first three days of birth. Due attention has to be paid to the navel region immediately after calving. The navel cord is ligatured or tied by applying a knot; the material used is an ordinary thick thread soaked in an antiseptic—lorexane cream, carbolic acid, tincture of iodine, phenyle or even methylated spirit. Lorexane and carbolic acid give the best results. The knot tied is at a distance of one inch from the navel and the cord is cut at about half-an-inch down the knot. The place around the knot is also painted with the same antiseptic for two days, when the cord dries up, leaving no chance for infection. Some farmers do apply an antiseptic but rarely tie a knot, in the absence of which the infection finds its way through the open end of the cord. The navel portion is then fomented twice daily

with hot water for about three days, when it ripens and is opened. The wound thus caused is cleaned with methylated spirit or pinky lotion, dried with cotton and filled with sulphonamide powder in which an equal part of proflavine sulphate is added. This dressing has been found very effective and cures the animals in a week's time.

RETENTION OF MECONIUM

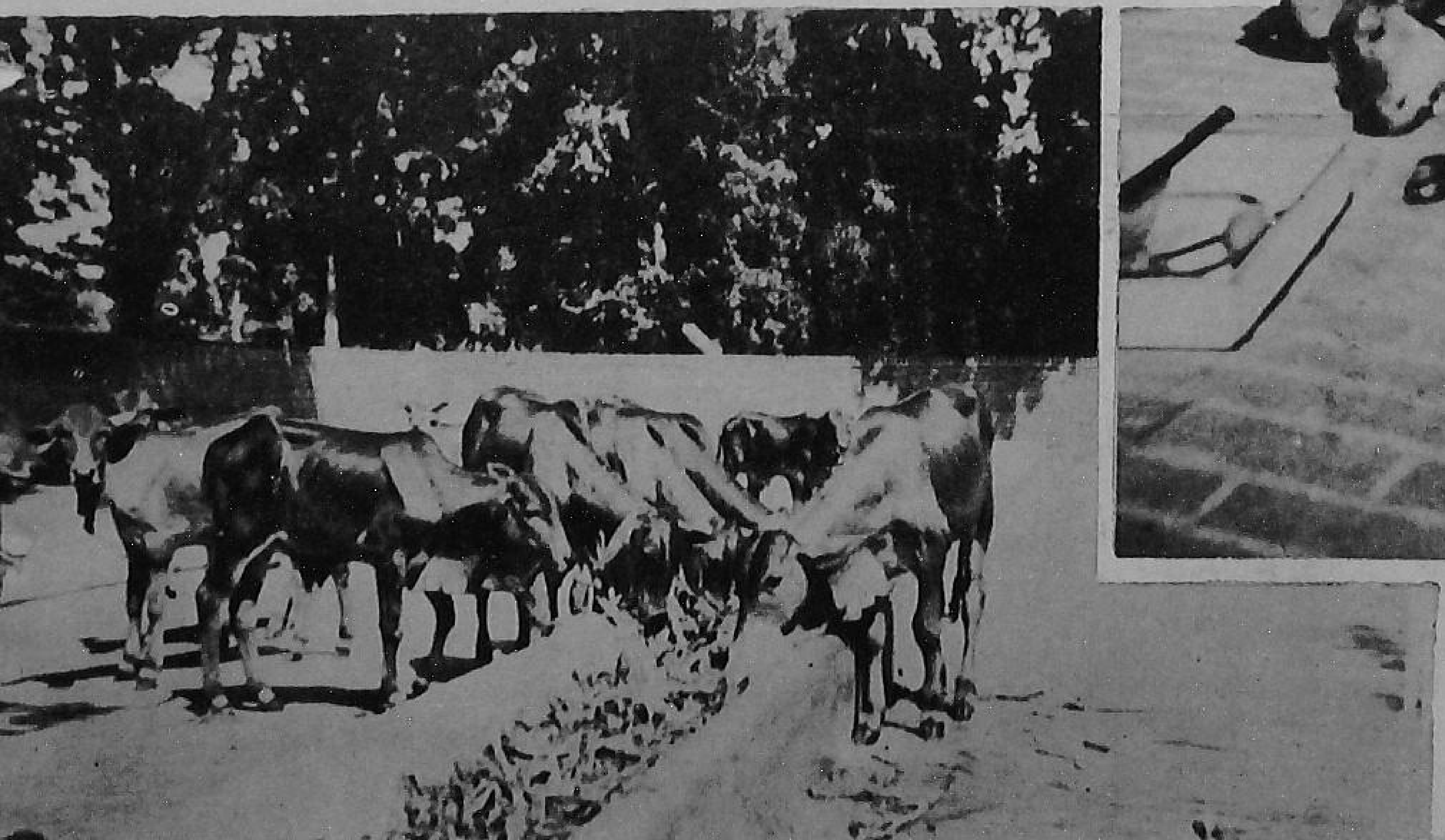
The third serious complaint of a new-born calf is the retention of meconium, the faeces formed in the intestines of the calf before birth. The meconium is a hard, black-coloured cylindrical mass, often coated with mucus and its expulsion is essential for the health of the calf. If the meconium is retained, the calf becomes dull, may not drink milk and gets bloated due to gas formation. Then it feels a lot of distress and uneasiness. In cases where the calf still continues taking milk without passing out the meconium, the condition may become worse as this milk is not digested properly and forms big lumps in the stomach. The calf slowly gets dull and lethargic and ultimately dies due to internal putrefaction.

The calf should be watched for a few hours and if the meconium is not passed out, one *chattak* of liquid paraffin mixed with four *chattaks* of warm milk is at once given and repeated after four hours if necessary. In the majority of cases, this helps in the expulsion of the meconium. If it does not work, then an enema of glycerine, or if this is not available, of soap and water is given, which will do the job. The previous practice of giving repeated doses of castor oil, magnesium sulphate or mustard oil should be avoided, as these damage the tender system of the calf, thereby reducing the chances of recovery.

Farmers should also pay more care to preventive measures such as cleanliness of the cow at the time of calving. The calf should be received on a clean and dry bedding of straw, and given necessary first aid as mentioned above, washing the utensils with boiling water and observing hygiene strictly. These measures go a long way towards reducing calf mortality.

The navel cord of a day-old calf being ligatured. This helps in keeping off navel ill

Feeding grain and fodder in clean mangers reduces chances of infection in calves



Bovine Tuberculosis, Blue Tongue And Swine Fever—

3 Great Killers Of Animals

by

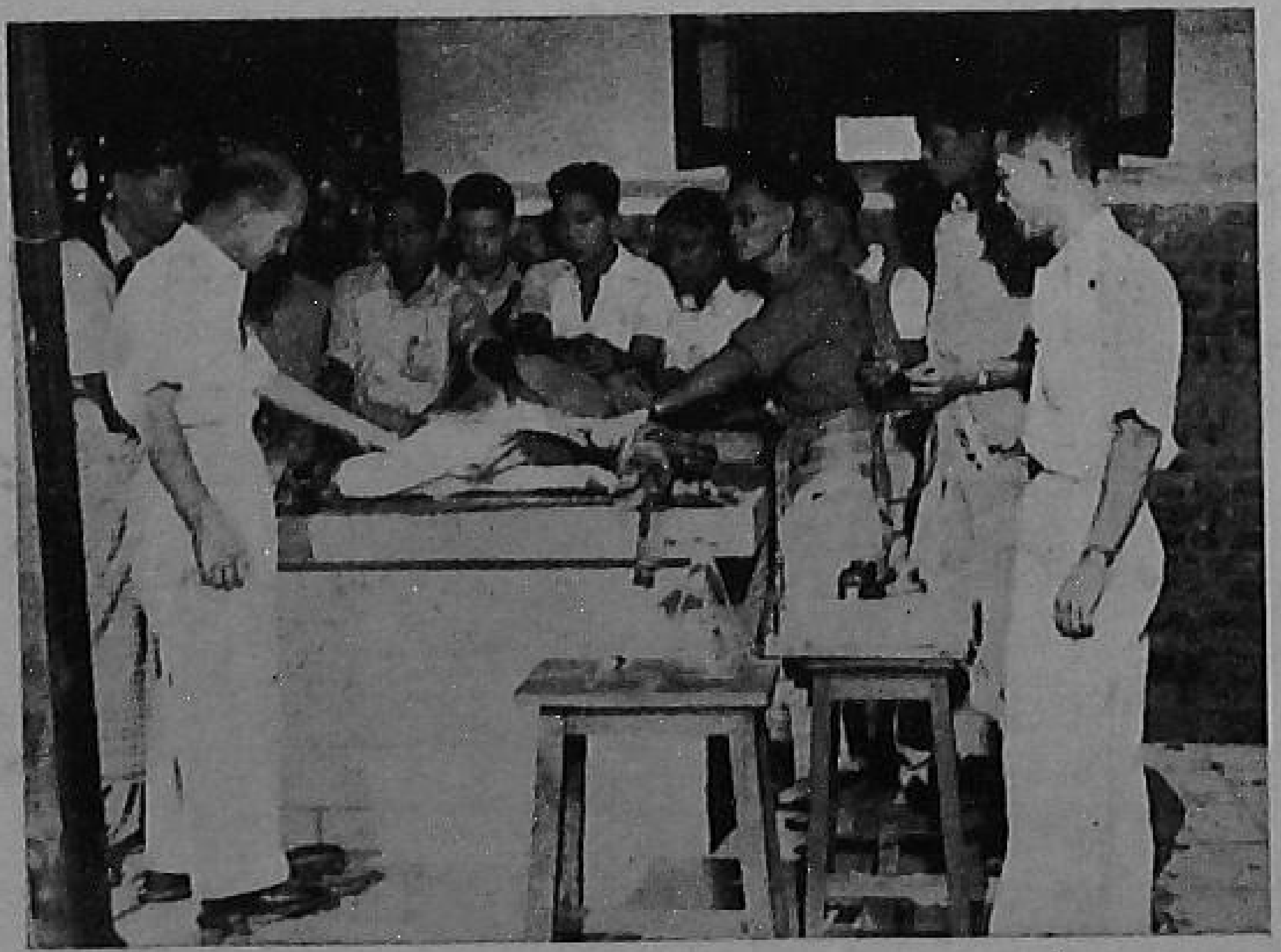
Sir Thomas Dalling

Consultant of the F.A.O.
Rome, Italy

BOVINE tuberculosis in cattle is responsible for considerable losses throughout the world, especially where intensive milk production is practised or where husbandry methods favour the spread of the infective causal agent. In some of the less developed countries, and in regions where cattle are mostly on free range, the incidence of the disease may be very small.

However, we must remember that bovine tuberculosis is also a disease of human beings. It occurs mostly in children and adolescents. The causal agent is conveyed mostly by the consumption of products, especially milk, derived from tuberculous animals, as well as by contact with infected livestock. Infected animals other than cattle, such as monkeys, dogs, cats and pigs, are all susceptible to bovine tuberculosis and may transmit the infection to human beings.

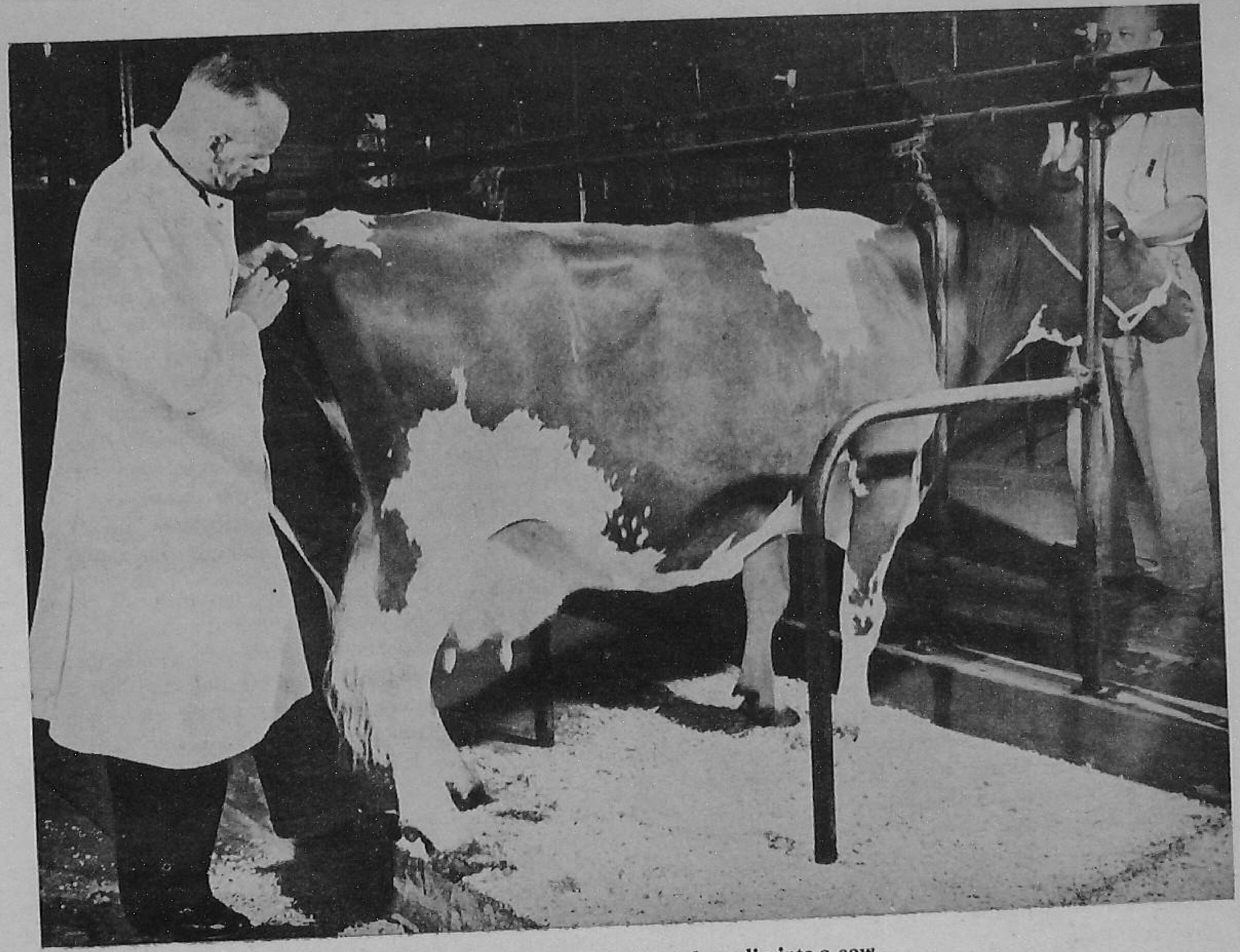
A F.A.O. veterinarian demonstrates how to draw blood from a calf for biological work at the Insein Veterinary College, Burma



It has been shown repeatedly that herds free from bovine tuberculosis give higher milk yield, the lower production in infected herds being not only due to its direct effects, but also to the indirect effects of the disease in opening the way for other diseases.

CONTROLLING THE DISEASE

Some earlier attempts to control bovine tuberculosis in herds did not always prove entirely successful. The essentials in controlling and eradicating the disease are to discover the infected animals, to separate them at once from other stock, to disinfect the premises occupied by them and to ensure that no further infection is introduced into the herd. While there may be a variety of ways in which the causal organism may enter a herd, the most important is the infected bovine, especially the animal which may be apparently healthy. The disease may be present in some organ or tissue of the animal, even for long periods during which no outward signs appear. It is this animal which is dangerous, because, quite suddenly, the infection in its quiescent form may become active and spread rapidly throughout the herd, even before any marked evidence of the disease is seen in the originally infected animal. Unfortunately, such an animal is quite often



The tuberculin test: injecting tuberculin into a cow

a high producer and the owner fails to appreciate the harm it may be doing. Such an animal also constitutes a danger to human beings.

TUBERCULIN TEST IS SAFEST CHECK

An acutely infected animal, with obvious signs of ill-health, may be diagnosed as suffering from bovine tuberculosis by the recognition of the causal agent in its bodily secretions or excretions, *e.g.*, milk, sputum and faeces. Diagnosis by this method is not always satisfactory, because the causal micro-organisms may not regularly appear. This method cannot be applied to an animal in which the lesion containing the active agents, but not excreting them, is temporarily sealed off. The only satisfactory diagnosis of bovine tuberculosis today is by the application of the tuberculin test, especially by the intradermal method. Here again, a few infected animals may fail to react.

Tuberculin, produced from *M. tuberculosis*, has long been used in the diagnosis of tuberculosis in animals, but the type of tuberculin, the methods of its application and the interpretation of the results have changed over the years. Most of the tuberculin in use today is a purified form which consists very largely of tuberculo-protein, produced during the artificial culture of the organism. The site of the injection of tuberculin also varies: in some countries, the neck is used, while in others the injection is made into the fold of skin at the top of the tail—the caudal fold. A difficulty in the use of tuberculin is the sensitivity of animals which carry infections other than true bovine tuberculosis. In such cases, there are reactions to some types of tuberculin.

Most of the tuberculins in use are derived from mammalian strains of *M. tuberculosis*, sometimes the true bovine strain, sometimes the human strain, sometimes a mixture of both strains. Tuberculins from these strains produce reactions not only in animals suffering from bovine tuberculosis, but also in animals with other sensitivities caused, *e.g.*, by the avian strain

of *M. tuberculosis*, by the causal agent of Johne's disease and by the micro-organisms which give rise to the so-called "skin tuberculosis". The result is that, in the application of tuberculin of mammalian origin, an animal suffering from any of these infections may react positively. This difficulty can be overcome to a large extent by the use of two tuberculins simultaneously—one of mammalian origin and the other of avian origin. Reactions to both tuberculins will be found in most animals with any of these infections, but the difference in the reactions as shown by their character and size assists in the determination of the presence or absence of bovine tuberculosis. The tuberculin test should be regarded as a herd test rather than as a test applied to an individual animal and the health history of a herd is of much value in the interpretation of the results of tuberculin tests.

HERD TESTS SHOULD BE REPEATED

In the eradication of bovine tuberculosis, the removal of animals reacting to tuberculin is essential, together with disinfection of the premises. It is also necessary to continue tuberculin testing at stated intervals in the remaining non-reacting animals in order to detect those in which the duration of the infection had not been sufficiently long to ensure their sensitivity in the former test. It may be necessary to repeat the tuberculin test in a herd a number of times until no reactors are found in two successive tests ; it is only then that the herd may be accepted as free from bovine tuberculosis. Ideally, the disposal of reactors should be by slaughter, and this is the system in some countries.

While experiments show that vaccines set up resistance to bovine tuberculosis in cattle, the many difficulties encountered in their application to cattle have resulted in a general veterinary opinion against their use.

Domestic animals, other than cattle, also suffer from bovine tuberculosis. Swine, for example, are quite susceptible and in some countries, the disease in them is extensive. Swine also suffer from avian and human tuberculosis and, in the application of tuberculin tests, it is always necessary, as it is sometimes in cattle, to use tuberculin of mammalian and avian origins. The possibility of the transmission of bovine tuberculosis from swine has also to be considered when eradicating the disease from an individual cattle herd, an area or a country.

DIAGNOSIS

While, usually, the clinical picture of the disease is sufficient for recognising its presence, even the advanced form of the disease may be confused with other conditions, especially internal parasitism. Microscopic examination of scrapings from the intestinal lesions may show the causal organism in infected animals, but the absence of the bacillus is not to be regarded as freedom from the infection, especially in animals in which the clinical symptoms have not yet developed to a marked extent.

The product Johnin, prepared by the cultivation of the causal organism in special liquid medium, is sometimes used for diagnosis, especially in the early stages of the disease. It is usually injected intradermally. Avian tuberculin is also sometimes used for diagnosis, injected intradermally, and causes a local reaction similar to that produced by johnin. Although these products are useful in some cases, they are not entirely reliable. Serological tests have also been studied and are said to be particularly useful for diagnosis, especially in infected animals over a year old

Bearing in mind that large numbers of bacilli are excreted in the faeces of infected animals and that young animals are particularly susceptible to the disease, methods of control should include the early detection and removal of infected animals and the early separation of the calf from its dam so that it may be reared out of contact with the infection.

IMMUNISING SUSCEPTIBLE ANIMALS

Some work has been carried out on immunising susceptible animals with vaccine containing the live virulent organisms incorporated in an excipient composed of mineral oil and finely-ground limestone. It is injected into young animals which are negative to johnin and avian tuberculin tests. The injection produces a hard swelling which may persist for some years. There is evidence that vaccination is useful in heavily-infected herds. Although the effects of a single injection of the vaccine may continue for some years, it is considered advisable to repeat vaccination every 15 months or even at shorter intervals. Treated animals become sensitive to tuberculin. This may cause some difficulty in the interpretation of results of the tuberculin test in treated herds. The use of the comparative tuberculin test, however, is of much assistance in determining the significance of the reactions.

BLUE TONGUE

Blue tongue is one of the most important diseases of sheep, causing the industry heavy economic losses in various parts of the world. The disease was first recognized in southern Africa and more recently diagnosed in the United States of America, Near East countries, Portugal and Spain. It is caused by a virus with considerable power of resistance, and may spread rapidly causing a mortality of about ten per cent

in most outbreaks, although the death rate may vary between two to 80 per cent. Much research work has been carried out on blue tongue, especially in South Africa, but there are still some important problems awaiting solution.

Blue tongue is characterised by a high temperature lasting from a few days to over a week, reddening of the membranes of the mouth and nose, discharge from the nose, swelling of the lips, tongue and the space between the branches of the lower jaw, peeling of the top layers of the skin of the lips and nostrils, and a general reddening of the skin, interfering with the nutrition of the wool and so causing breaks in the wool. Sometimes there is inflamation in the feet. Affected lambs may also show signs of diarrhoea.

Field evidence indicates that sheep exposed at night to species of culicoides (midges), especially in low-lying humid districts in the infected areas, contract the infecttion. Outbreaks occur only during the late summer months, but it does not follow that sheep will become infected even when large numbers of midges may be present under conditions considered good for transmission. This may be because the midges do not carry the virus from one season to another and because the true reservoirs of the infection, at present unknown, are not present.

There is no exact information as yet on the spread of the disease into non-infected areas or countries. It is known from experimental work that sheep which have recovered from the infection may continue to harbour the causal virus in a much reduced state of virulence for some weeks (120 days). Such recovered sheep may, therefore, continue to be a cause of residual infection.

MUTTON BREEDS MORE SUSCEPTIBLE

Though blue tongue affects all breeds of sheep, mutton breeds are more susceptible than Merinos. Variations of individual susceptibility occur within a breed. Cattle are also susceptible, but to a lesser degree. Affected cattle have been found in Israel and some European countries. The absence of the clinical symptoms of the disease in cattle in South Africa may be because of the exposure of the young animals to the infection when they are in a protected state due to the passive immunity derived from their dams. Although cattle may show little or no clinical evidence of the infection, they can, nevertheless, harbour the causal virus. There is evidence from experiments that the virus may be present for up to 70 days following artificial infection. It is also known that wild rodents may carry the infection.

There seems to be little doubt that blue tongue is insect-transmitted, but information on the reservoirs of the causal virus is still lacking. As it is impossible yet to eradicate the transmitting insects, prevention of the disease must consist in the annual mass vaccination of susceptible animals. From time to time, different types of vaccines have been produced. The type now in general use is a vaccine consisting of four different strains of the virus, whose virulence has been much reduced by passage through developing chick embryos. It is produced in a freeze-dried form and can, therefore, be kept for long periods under suitable conditions. It is cheap, easily prepared and transported, and safe to use except, perhaps, in ewes vaccinated for the first time during pregnancy. In America a few vaccinated ewes gave birth to abnormal lambs. Although this vaccine is giving satisfactory results, a disadvantage with this vaccine is that, because a number of strains of the virus are used in its preparation, a high immunity against all of them may not be established.

SWINE FEVER

In pigs, the disease which causes the greatest economic losses, is probably the swine fever (hog cholera). It is found in most parts of the world where pigs are kept. The incidence varies from country to country. In some, the disease is endemic and, in spite of the best efforts to control and eradicate the infection, repeated outbreaks occur, often associated with the movement of pigs. On the other hand, some countries which raise pigs on an extensive scale, have remained free from swine fever, perhaps due to the restriction on import of pig and pig products from other countries. Such imports, especially of pig products, have introduced the disease into countries which were free from the infection.

COMBATING THE DISEASE

Undoubtedly, quick results are obtained from a strict slaughter policy with restrictions on movement, the destruction of carcasses of the slaughtered animals and careful disinfection of infected premises. In countries in which the disease is endemic, however, a suitable slaughter policy is usually ineffective, although the restriction on movement of pigs out of or into prescribed infected areas will prevent its spread to other areas. The application of regulations for the cooking of all garbage (swill) also helps in preventing the spread of the disease.

In countries in which swine fever is endemic, vaccination is usually practised, sometimes on an extensive scale. The simultaneous injection of the living causal virus and protective serum was used for many years and, although effective in controlling the disease, it was not entirely satisfactory because some pigs became ill within a few days, and breaks in the immunity were sometimes found after a few months. These occurrences were seen in spite of strict control of the potencies

CONTINUED ON PAGE 40

Ammonium Sulphate Nitrate

The Fertilizer For Linseed

by
B.P. Mathur
Indian Agricultural Research Institute, New Delhi

Linseed is one of the most important oilseed crops of northern and central India and is mainly grown for oil and fibre. The oil is used for the manufacture of paints, varnishes and oil cloth. The fibre is used for making rope, twines, canvas, carpets, artificial silk and nitro-cellulose products. The oilcake is used for manuring crops and feeding livestock.

India is one of the main producers and exporters of this crop, but the production per acre has been very poor, ranging from 215 to 255 pounds per acre. A series of experiments were therefore conducted by the Indian Council of Agricultural Research and the Indian Central Oilseeds Committee with a view to stepping up the production of linseed in the country. The results of these experiments are described in this article.

EXTENSIVE investigations have revealed that the non-availability of suitable improved varieties and raising the crop without application of manures and fertilizers are two main causes for the extremely low yields of linseed in our country.

A number of rust-resistant strains of linseed have, however, been evolved which can be adopted by the farmers profitably. It has also been found that linseed responds well to nitrogenous fertilizers, notably ammonium sulphate nitrate

In trials conducted at the Indian Agricultural Research Institute, New Delhi, four nitrogenous fertilizers were compared for their relative effectiveness, *viz.*, ammonium sulphate, ammonium sulphate nitrate, urea and calcium ammonium nitrate. They were applied at 10, 20, 40, and 80 pounds of nitrogen per acre. The variety used in the trials was R.R.9.

The results of the field trials, conducted for three years, are given below.

	Increase in yield in maunds per acre				
Doses of nitrogen in pounds	*Amm. sulphate*	*Amm. sulphate nitrate*	*Urea*	*Calcium amm. nitrate*	*Mean*
10	4.34	3.63	2.63	4.70	3.83
20	4.50	5.11	3.96	4.97	4.63
40	8.89	9.27	6.20	8.09	8.11
80	10.06	10.14	7.43	8.83	9.12
Mean	6.95	7.04	5.06	6.65	

The data given in the above table indicate that the extra yield due to increase in the dose of nitrogen, irrespective of its source, was appreciable up to 40 pounds, after which the increase was not significant. On an average, 40 pounds nitrogen gave an increase of 8.11 maunds per acre and was found to be the most effective and remunerative dose in the case of all the four fertilizers. The response with ammonium sulphate nitrate was the highest, closely followed by ammonium sulphate, calcium ammonium nitrate and urea.

WHICH FERTILIZER IS ECONOMICAL

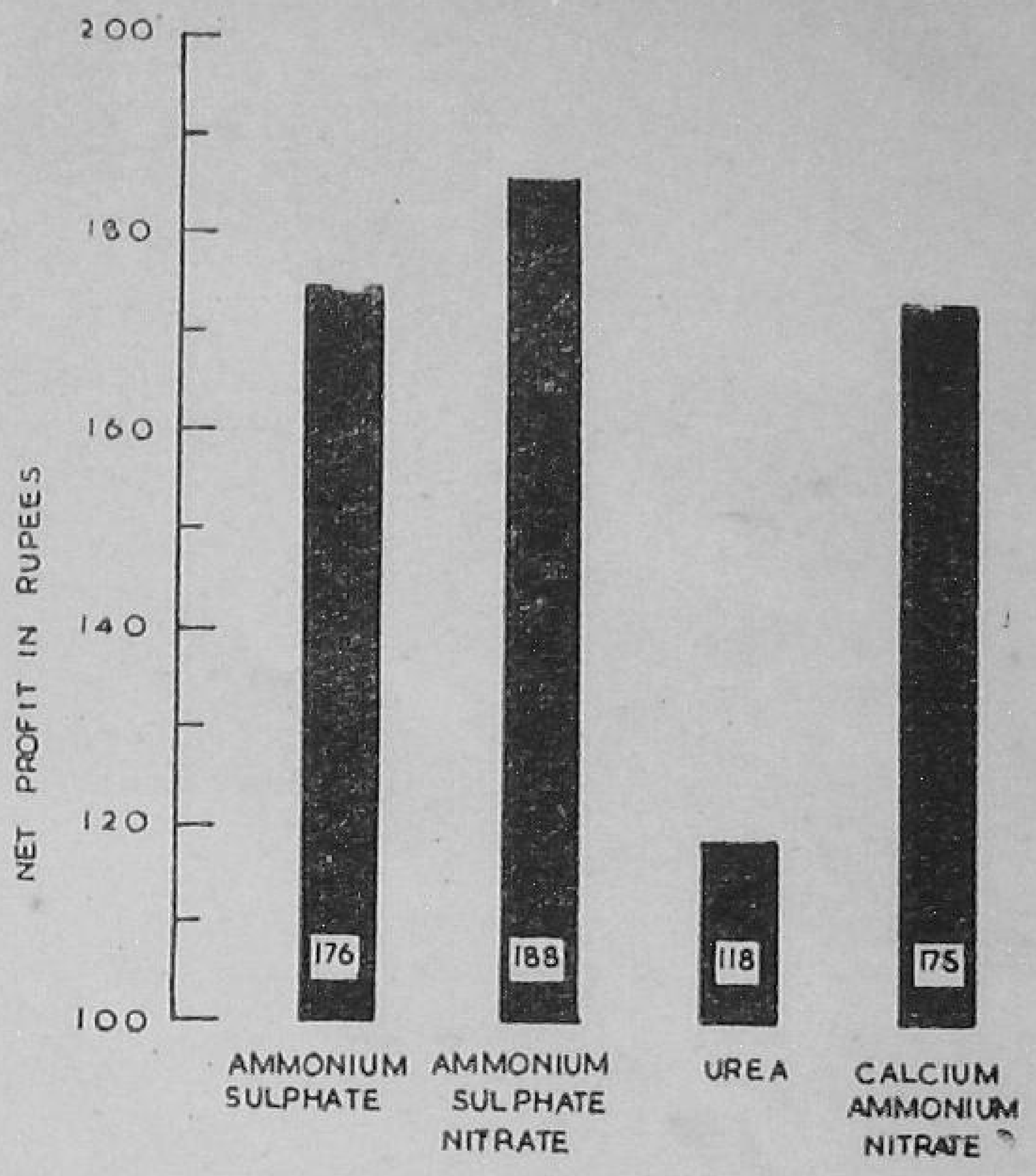
Ammonium sulphate costs about Rs. 13.57 per maund; ammonium sulphate nitrate Rs. 16.07, urea Rs. 25.71, and calcium ammonium nitrate Rs. 13.57. On the basis of these prices, and taking the price of linseed at Rs. 23.66 per maund, the net profit at 40 pounds nitrogen per acre is given in the table opposite.

It will be seen that ammonium sulphate nitrate gives the maximum profit, although the profits obtained from the other fertilizers are quite attractive. Urea is a comparatively cheaper source of nitrogen and compares favourably in profits with the other three sources.

Under the new fertilizer programme, urea, ammonium sulphate nitrate and calcium ammonium

nitrate will be manufactured on a large scale in the country and it is likely that their prices may go down in the near future. Under such circumstances, the extensive use of these fertilizers will be most beneficial for the linseed crop.

Fertilizer at 40 pounds nitrogen per acre	*Cost in Rs.*	*Extra produce in mds. per acre*	*Value of extra produce in Rs.*	*Net profit in Rs.*	*Percentage on investment*
Amm. sulphate	33.93	8.89	210.34	176.41	519.92
Amm. sulphate nitrate	30.91	9.27	219.33	188.42	609.57
Urea	28.57	6.20	146.69	118.12	413.44
Calcium amm. nitrate	33.93	8.83	208.92	174.99	519.92



Net profit at 40 pounds nitrogen

THE FERTILIZERS USED IN THE TRIALS

Ammonium sulphate, one of the most common sources of nitrogen, is now being manufactured at Sindri, Mysore and Alwaye. It contains 20.6 per cent nitrogen. It is readily soluble in water and is hence immediately available for plant growth. It supplies nitrogen in the form of ammonia.

Ammonium sulphate nitrate is a more concentrated source of nitrogen than ammonium sulphate. It contains 26 per cent nitrogen which is supplied in the form of ammonia and nitrate.

Urea is the most concentrated source of nitrogen. It contains 45 per cent nitrogen which is available in the form of ammonia. It is less acidic than ammonium sulphate.

Calcium ammonium nitrate contains 20 per cent nitrogen which is released in the form of ammonia and nitrate. As it contains calcium, it is good for acidic as well as alkaline soils.

A fine crop of linseed: it received 40 pounds nitrogen, the optimum dose

RUSSIAN BRE
AND BUCKS

H.M.
Research Officer, Indian C

Caucasian ram

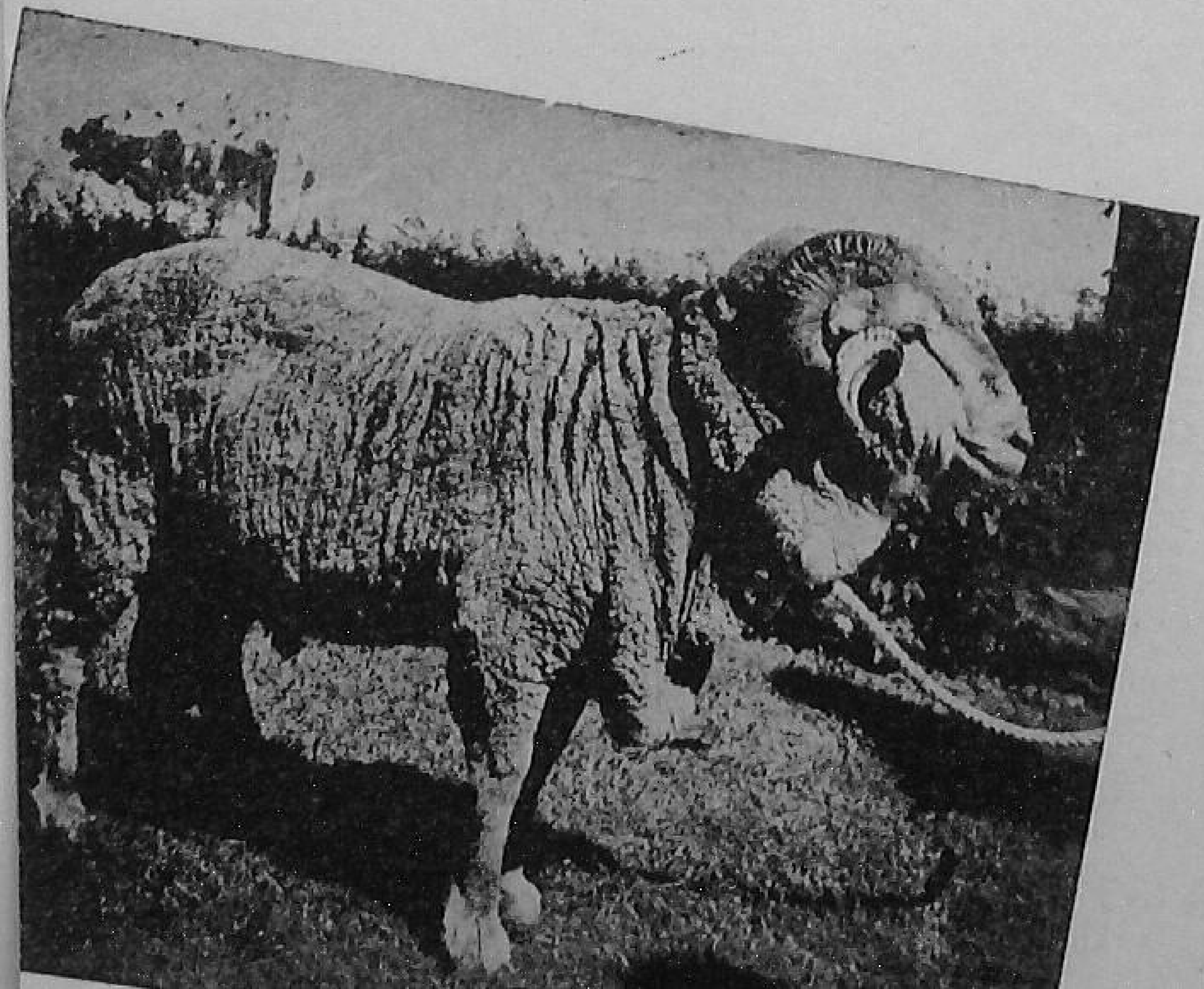
TUESDAY the 3rd November, 1959, is a landmark in the sheep and goat breeding history of our country. That day, the Russian Ambassador in India, Shri I. A. Benediktov, on behalf of the Government of the U.S.S.R., presented eight rams and two bucks to India. The gift was received by Shri Panjabrao S. Deshmukh, Union Minister for Agriculture.

These animals were flown to India by a special chartered Russian plane.

For the development of our breeds of sheep and goats, various projects are in operation all over the country with a view to producing more and better wool and meat. The animals presented by the Soviet Union will form a part of these projects. They will be given trials by crossing them with local ewes and goats. The progenies will be studied for size and for the quality and quantity of wool produced by them.

Kuib

Groznin Skia ram



The rams received are of four different types, from four different areas. A brief description of the various breeds is given below.

GROZNIN SKIA

This breed comes from the Caucasian area of the U.S.S.R. The animal yields wool of a very fine silky quality. The length of the wool fibre may be as much as 11 centimetres. The average annual yield is 16

DING RAMS FOR INDIA

atia

l of Agricultural Research

kilograms. The two rams which have been presented have yielded 14.5 and 17 kilograms of wool at the age of 24 months, when their body weight was 71 and 73 kilograms, respectively. The rams received are being sent to Kashmir where trials will be conducted to find out the possibility of upgrading the local sheep at the Sheep Breeding Farm, Ban.hal.

Stavoropal ram

ram

CAUCASIAN

This breed also comes from the famous Caucasian mountains, the body size being larger than that of Groznin. The live weight on an average is 110 kilograms. Hence, in addition to yielding wool of a very high quality, they can also be a good source of meat. The average annual yield of wool is 16.4 kilograms, the length of the fibre going up to 17 centimetres. The rams received have been sent to Himachal Pradesh for use in the Government Sheep Breeding Farm, Sarhan.

STAVOROPAL

The home of this breed is the Sovetskoye Runo State Farm in the Stavoropal region, an area with dry climate. They can withstand temperatures up to 40°C. These animals are famous for the fine quality of their wool. The females yield a fair quantity of milk. The length of the wool fibre may go up to 15 centimetres, the average annual clip being 16.4 kilograms. The rams received weighed 85 and 75 kilograms and yielded 16.1 and 18.3 kilograms of wool, respectively, at the age of 24 months. The Stavoropals have been sent to the

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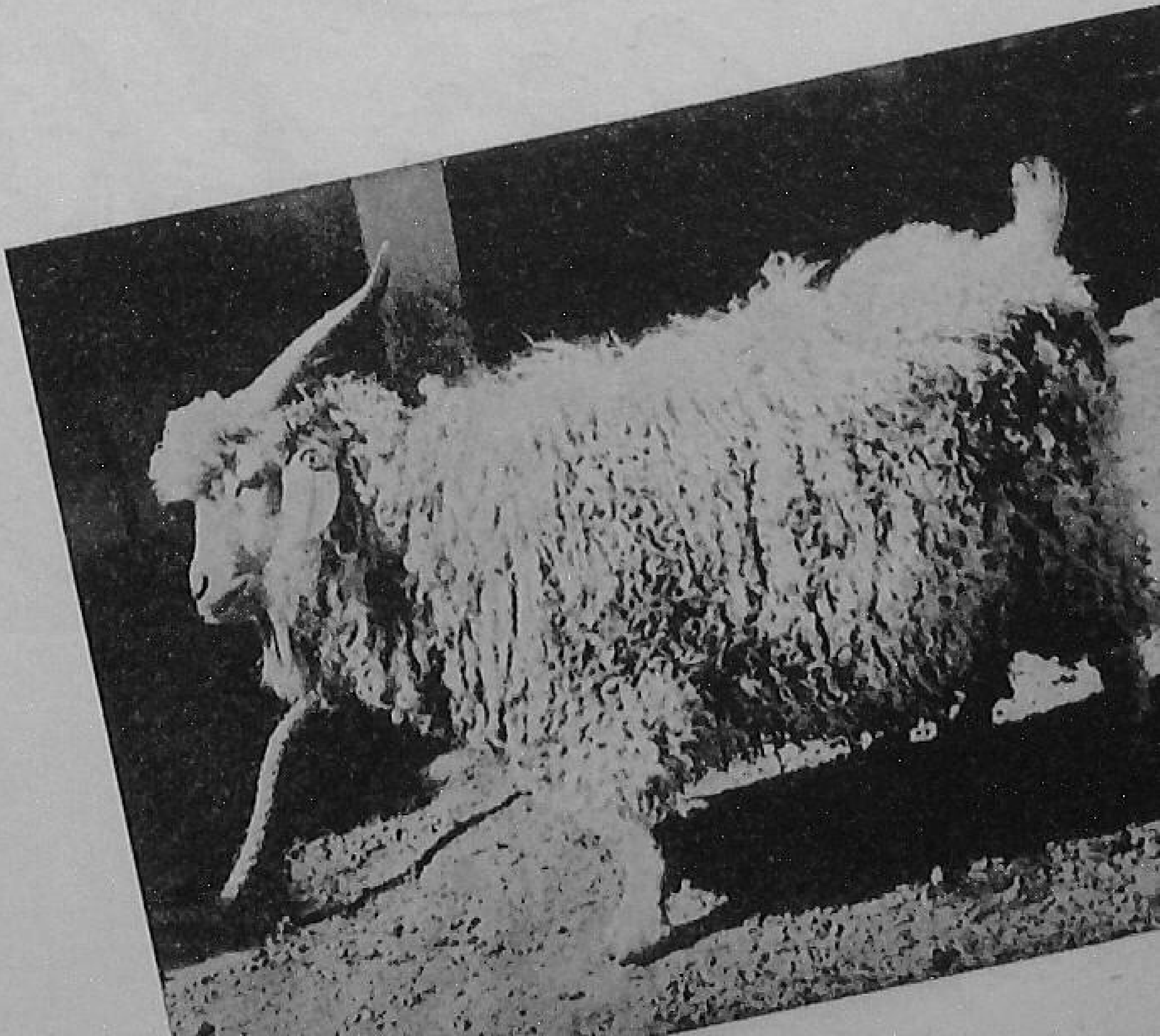
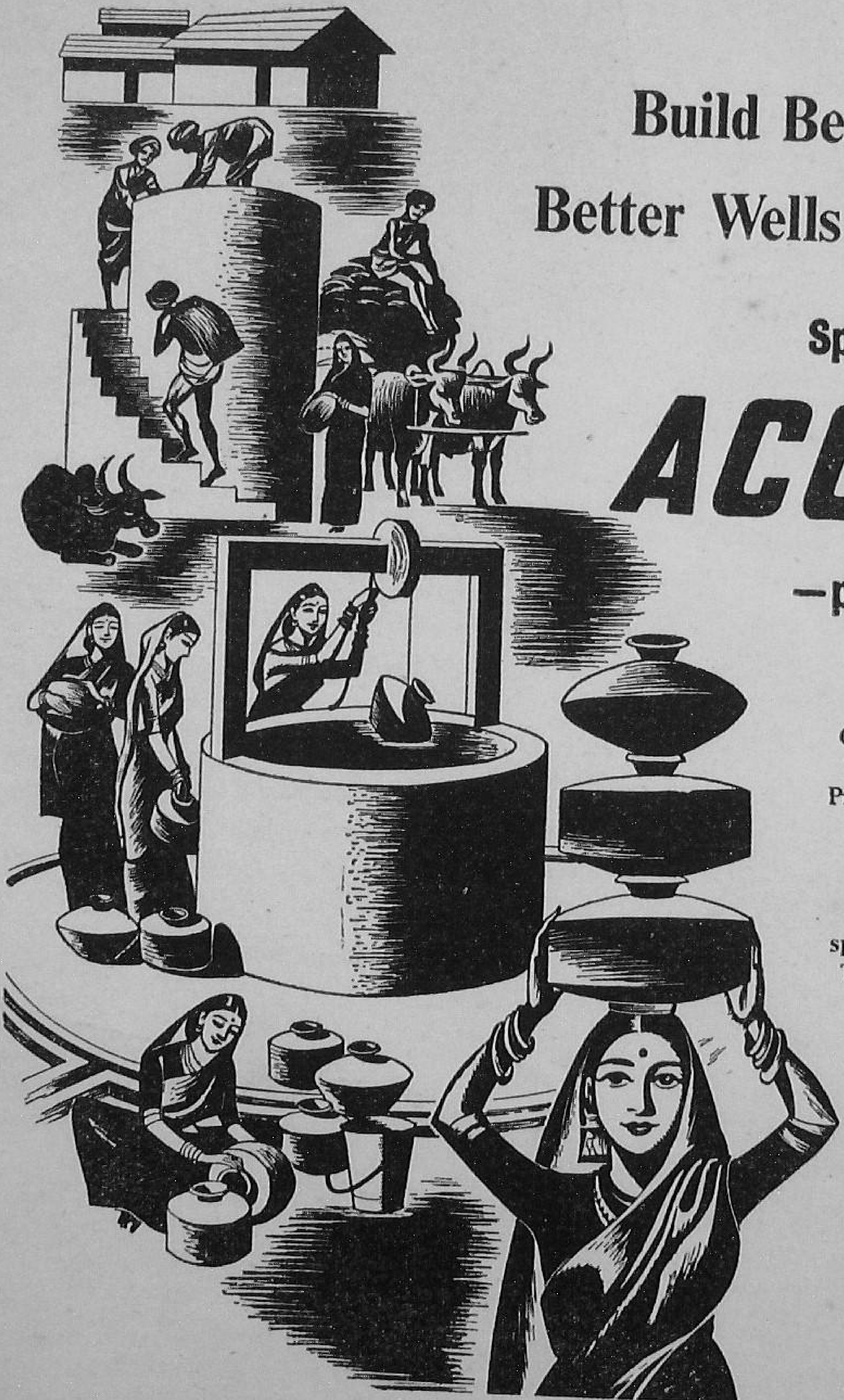
Angora buck





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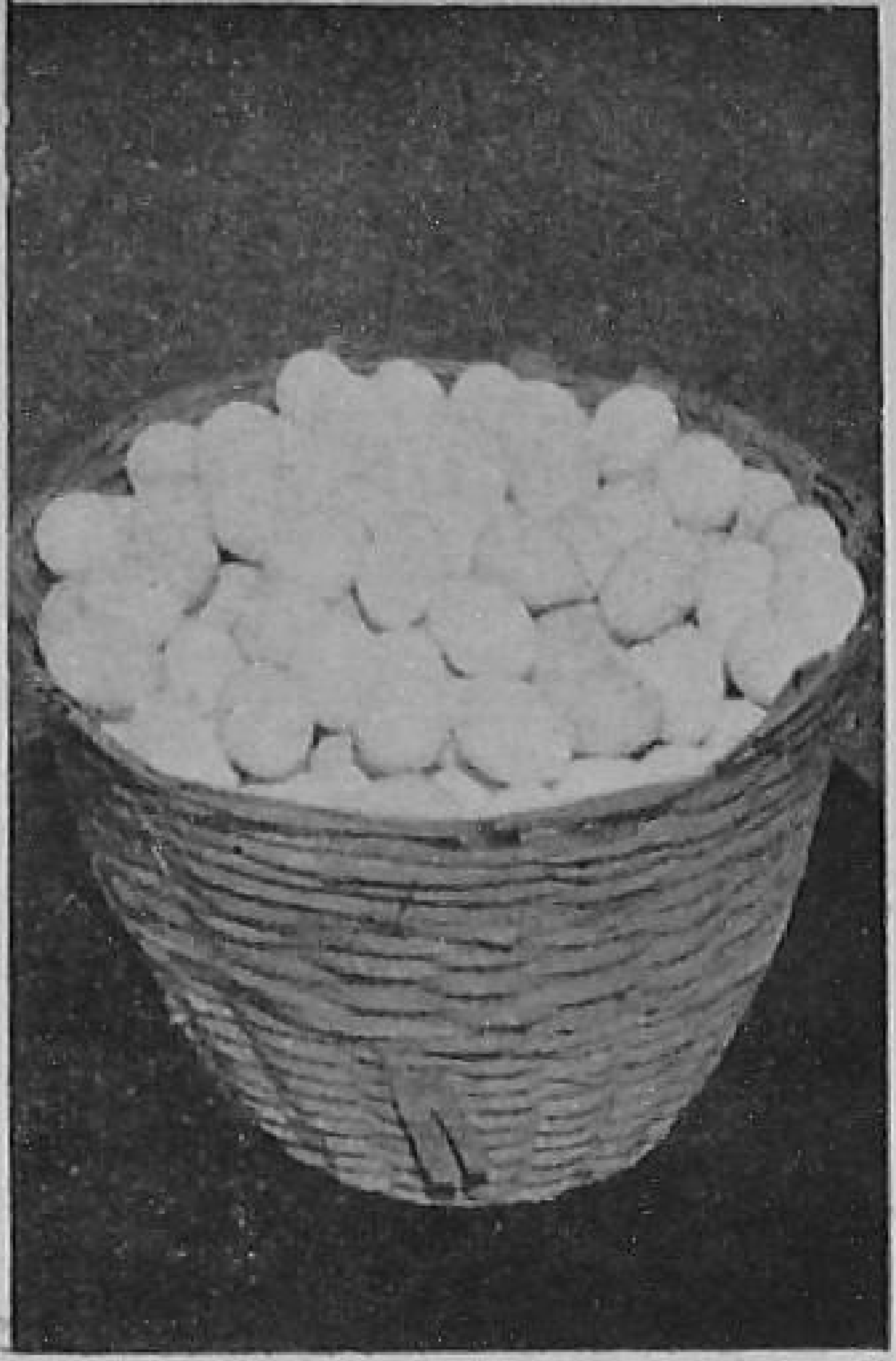


How They Determine Egg Quality

by

S. Bose

Indian Veterinary Research Institute
Izatnagar, U. P.

THE nutritive egg can make up to a great extent the deficiencies in the average Indian diet. Normally, in our homes there is more emphasis on cereals rather than on foodstuffs of animal origin, as a result of which the diet becomes poor and ill-balanced.

The importance of eggs in human nutrition arises from their value as a protective food. They contain most of the known vitamins and a good assortment of mineral elements. Their proteins are of high biological value and the fat is very nutritive.

Eggs form an ideal diet for patients suffering from diabetes, gout and anaemia because of their low content of sugar, the high biological value of their proteins, their negligible content of purines (compound derived from malonic and oxalic acid, e.g., caffein) and the availablity of their iron for the formation of haemoglobin. The digestibility of eggs is high. Cooking has no appreciable effect on the digestibility and utilization of the proteins and fat in eggs.

A comparison of the dietary value of eggs with that of half-a-pint of milk reveals that there is little difference in the calorific value, or the proteins, fat, vitamin A, vitamin B and riboflavin from these sources. Milk, however, is a much more important source of calcium than egg. Eggs cannot be regarded a good source of calcium due to the fact that the egg shell is not included in the human diet. The egg, however, is rich in iron in which milk is so deficient. The egg also supplies a much larger quantity of vitamin D than milk. As the egg is deficient in vitamin C, it is necessary to include vegetables or fruits in the diet.

A number of experiments have indicated the usefulness of eggs in supplementing the diet of children. Investigations carried out at the Indian Veterinary Research Institute have demonstrated that feeding of an average Bengali village diet to young rats resulted in their unsatisfactory growth and poor health. The addition of eggs to their diet proved very beneficial, and still further improvement was obtained by 0.5 per cent addition of egg shell.

Methods for determining the quality of eggs are based upon their physical and chemical characteristics. The shell of the egg, which consists mostly of calcium carbonate, is somewhat porous in structure and allows evaporation of water from within.

INTERNAL STRUCTURE

The yolk is practically spherical in shape ; when the egg is broken, it stands up well. On the upper surface of the yolk there is the germ spot, which in a fertile egg kept at proper temperature develops into the embryo. A membrane called the vitelline membrane surrounds the yolk. When an egg is kept for some time under adverse environmental conditions, e.g., high temperature and dry atmosphere, the yolk tends to increase in size by taking up water from the white, thus weakening the yolk membrane. When such an egg is broken, the yolk becomes flat. This change in the size of the yolk is one of the indications of deterioration in the quality of the egg. The relationship between the height and width of the yolk is called the yolk index, and is helpful in judging egg quality.

The white, or albumen of the egg, consists of four different parts. At the opposite ends of the yolk there is a white, thick, twisted, rope-like structure, the chalaza. It helps the yolk in turning easily within the white and serves to keep the yolk approximately in the centre of

the egg. It also prevents the yolk from being damaged in case the egg is handled roughly.

In the oviduct, the egg is rotated in one direction only to form the chalaza, but if the process is continued long, the yolk breaks. This is why during incubation turning is not done in one direction.

The chalaza is surrounded by a layer of "thin white" called inner thin white. This in turn is surrounded by a layer of "thick white," beyond which is the "outer thin white." The difference between the thick and the thin white is due to the presence of a protein called mucin in the former. This protein is almost completely absent in the thin white. The thick white and the inner thin white together are known as the apparent thick white. It is the apparent thick white which one sees as a jelly-like material around the yolk when an egg of good quality is opened.

THE ALBUMEN INDEX

The condition of the apparent thick white is judged by the albumen index which is got by dividing the height of the thick white by the mean width. The improved method of measuring quality includes not only determination of the yolk index and albumen index but also of the percentage of outer thin white. This is done by drawing out the outer thin white and measuring it in a graduated cylinder.

The flavour of cooked eggs varies directly with the above physical measurements. The albumen index and yolk index are not influenced by the type of feed, although the albumen index appears to be affected by the breed or strain differences of laying birds. High temperature is the most important single factor in the deterioration of egg quality. Both the yolk and albumen quality are affected by the temperature. The optimum temperature for holding eggs at the farm or at home is 40° to 55°F; and for cold storage, 29° to 30°F. As fertile eggs start germinating at temperatures above 69°F, keeping eggs above 60°F should be avoided.

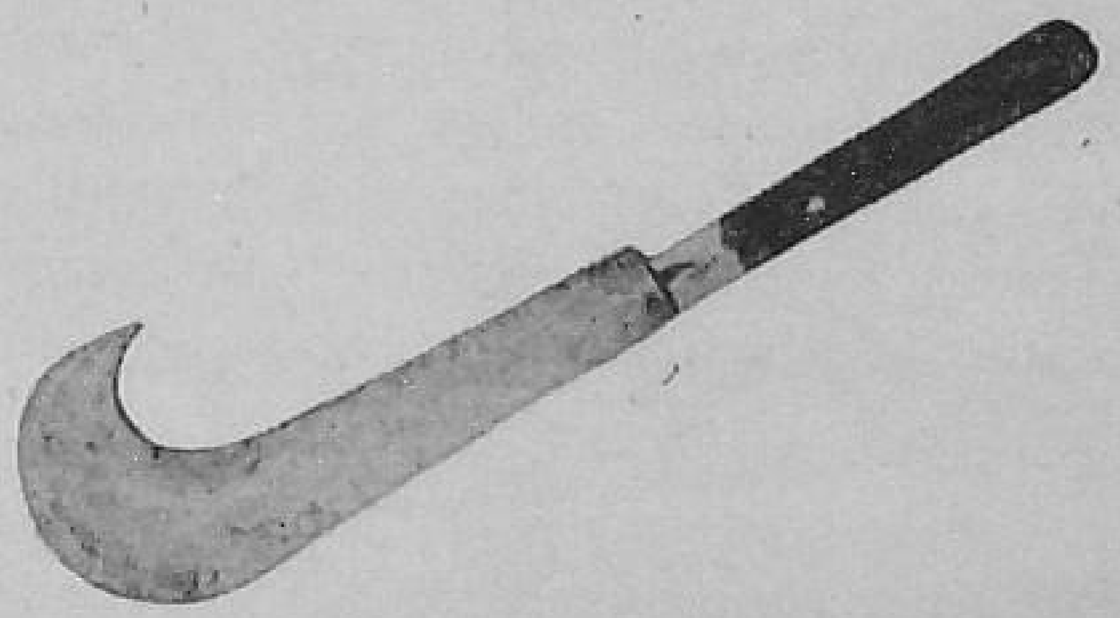
Proper humidity is necessary for maintaining quality in eggs. The size of the air cell, which is used as a measure of egg quality in grading, increases with the loss of moisture from the egg. The air cell normally develops at the large end of the egg through the separation of the two shell membranes and the consequent filling of the space with air. In eggs of the best quality, the air cell is small, not over 1/8 inch in depth and 0.5 inch in diameter. The increase in size of the air cell can be prevented by the maintenance of high humidity around the egg.

But when the relative humidity is high, moulds grow on the egg. A white mould growth commonly known as "whiskers" frequently occurs at 90 to 94 per cent relative humidity. This growth of the mould in cold storage serves as an indication of high humidity. It is advisable to keep humidity below 80 to 85 per cent.

KATURI

A Multipurpose Cutter

A SPECIAL type of multipurpose cutting implement, the *katuri*, has been designed and forged in the workshop wing attached to the Extension Training Centre, Bolangir, Orissa. The instrument has been found very useful in the farm for cutting canes (*bet*), harvesting jute, *arhar*, sannhemp, *jowar*, cauliflower, cabbage and for stripping sugarcane leaves. One has simply to set the instrument at the proper place and pull by hand with a little force, which will vary



according to the thickness and hardness of the material to be cut. With the *katuri*, one can cut harder and thicker material more easily than with a sickle.

For cutting sugarcane, the curved edge of the *katuri* has to be dented, so that the hard stems are cut clean by its sawing action.

The *katuri* is 15 inches long and weighs about a pound. The sharp edge extends from the tip to the middle of the blade. The *katuri* is forged from scrap spring steel of motor vehicles and costs nearly Rs. 3.50.

A village blacksmith with the help of a boy for operating the blower can forge four such knives a day. He will need two more days for tempering to get the required hardness, finish, sharpness and for fixing the handle. The instrument can be easily sharpened on a small grinding stone.

WHAT'S NEW IN FARMING

The Rabi Fallow

IF YOU are one of those who leave the field fallow after the *kharif* crop is cut, you would be well-advised to grow a *rabi* crop. This would be possible if your *kharif* crop is cut by mid-November, and more so if yours is an irrigated area.

Experiments at Gorakhpur in Uttar Pradesh have pointed out that you could profitably raise a leguminous crop like *masoor* (lentil), pea, (*matra*) or berseem for fodder. You could also grow similar crops with profit after taking *jowar, bajra* or maize. By taking these *rabi* crops, you will help increase the fertility of the soil, in addition to getting an extra income from the grain or fodder thus produced.

The Uttar Pradesh Department of Agriculture also recommends the use of superphosphate for increasing the yields of such *rabi* crops. This will help in getting a better yield from your next crop too. The superphosphate dose recommended is a maund per acre applied in furrows at the last ploughing.

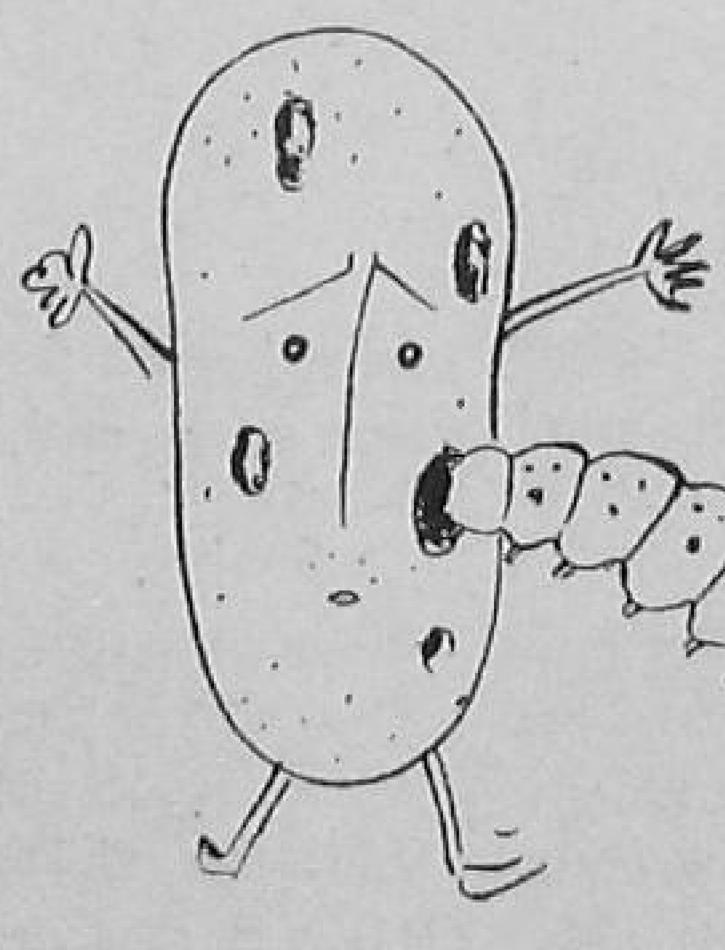
Green Manuring Paddy

FOR green manuring paddy, quick-growing crops like sannhemp, *dhaincha, Sesbania sericea, Sesbania macrocarpa* and *Stizolobium* can be sown with the onset of the monsoon in May or June. Work at the Central Rice Research Station, Cuttack, has shown that these crops yield 4,000 to 6,000 pounds of green matter six weeks after sowing. The plants can be buried in the soil early in July at the time of puddling.

For manuring the second season rice crop, *Sesbania speciosa, Sesbania sericea*, cowpea, *siri, mung, Crotolaria usaramoensis* and *Crotolaria brownii* can be sown in November. They give nearly 4,000 pounds of green matter within eight weeks. *Sesbania speciosa* can be planted on bunds after transplanting the paddy. About 3,000 to 4,000 pounds of green matter can be obtained from the bunds in an acre. *Glyricidia maculata*, a perennial shrub, can be planted on roadsides and channel bunds; 40 to 50 pounds of leafy matter are available from each shrub every year.

Potato Tuber Moth

THE potato tuber moth damages the tubers by tunnelling into the



flesh, making them unfit for human consumption and seed purposes. Under field conditions, the larvae of the moth have been observed to feed on both the stems and leaves, causing reduction in yield. In the field, the eggs are laid on the stems and leaves, whereas in storage, they are laid on or around the eyes of the tubers and on the walls and corners of the godown.

Work at the Central Potato Research Institute shows that spraying the crop in the field with five per cent "Toxaphene" at 40 pounds per acre gives good results. In storage, "Malathion" 40 per cent dust and "Parathion" 20 per cent wettable were found more effective than five per cent D.D.T., which is commonly used for controlling the infestation in godowns.

Tubers treated with these insecticides become unfit for the table, but can be used for seed purposes.

Seed Onions

IN PLANTING onions for seed, better use mother bulbs weighing not less than 40 grams.

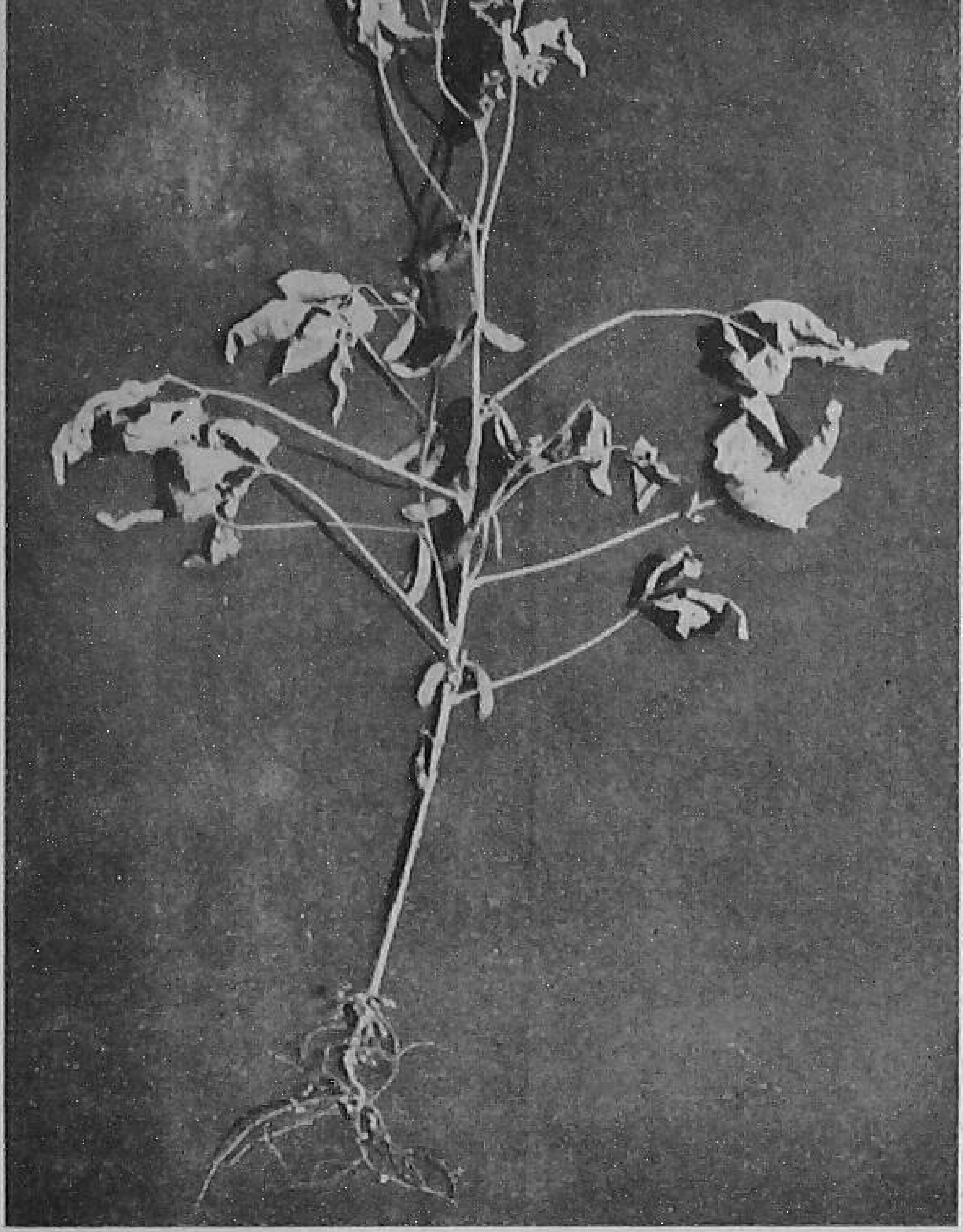
In trials conducted at Niphad in Bombay, the seed yield was found to increase with the size of the bulbs. Small-sized bulbs were more subject to rotting, while better sprouting was seen in large bulbs. Smaller bulbs also lost more in storage.

Poultry Ticks

CONTROL OF TICKS has always been a problem for poultry breeders. Repeated bites by the nymphs and adults may cause anaemia in the birds due to loss of blood. Egg production under such conditions is reduced or stopped. In some trials in which the birds were dipped in solutions of various insecticides, "Malathion" (one per cent), "Gammexane" (0.33 per cent) and "Diazinon 20 E" (0.025 per cent) were found equally effective. The residual effect of "Gammexane" however persisted for four weeks, as compared to two weeks and one week for "Malathion" and "Diazinon 20E", respectively.

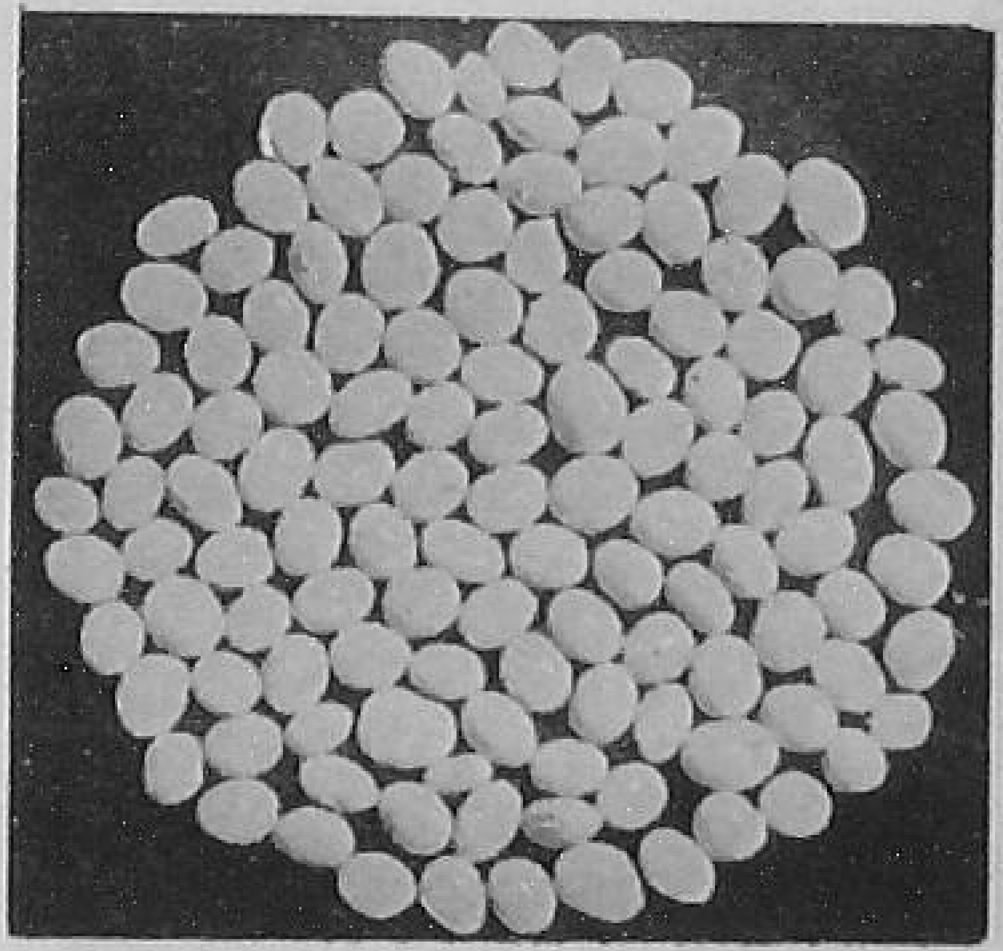
Why Not Grow

IT'S



The soybean plant

U.S.A and India almost at the same time at end of the 19th century. While in the States the acreage under soybean slowly went up to 22 million acres in 1956, in India both the expansion in acreage and yield per



Seeds of the improved variety *Monetta*

THE soybean is an excellent food. Its oil content is high, as also the protein content of the kernel. The soybean oil, like groundnut oil, can be used by the housewife for cooking and in industry for lacquer paints, varnishes, lubricants, etc. The oil-cakes have high feed value for livestock. Soybean flour or cooked bean are a valuable food for diabetic patients. Thus, it is in no way inferior to groundnut; yet for various reasons, the soybean has never found as much favour as the groundnut with the farmer in India.

Perhaps the Indian farmer is hesitant to grow it because the soybean varieties introduced so far are mostly of indifferent taste. While the peanut kernels are delicious and can be directly taken as food either raw or roasted in oil, the soybean is generally consumed after cooking. Further, groundnut kernels have an assured market abroad, but the soybean faces heavy competition from the U.S.A. and China which are large producers of soybean. Also, soybean has to replace one of the pulse crops which are commonly grown in India and consumed as *dal*.

Though early records show that it was cultivated as long ago as 3,000 B.C., it was introduced in the acre lagged far behind. The farmers took to groundnut more enthusiastically.

Soybean can be grown successfully in drier areas of the country where rainfall does not exceed 35 inches. It is grown in the hills up to elevations of 6,000 feet above sea level, particularly in Assam, Orissa, Bengal, Manipur, the Khasi and Naga Hills and the Kumaon Hills in U.P.

SEARCH FOR PROMISING VARIETIES

The work on selection of promising varieties was started at Pusa in Bihar in 1920, when a large number of varieties were put to test. As a result, three varieties, yellow, chocolate and black were selected. The yellow variety, which outyielded others, proved more popular. It took 145 to 150 days for maturity. Its seed was distributed year after year until 1950, when it was succeeded by other superior varieties.

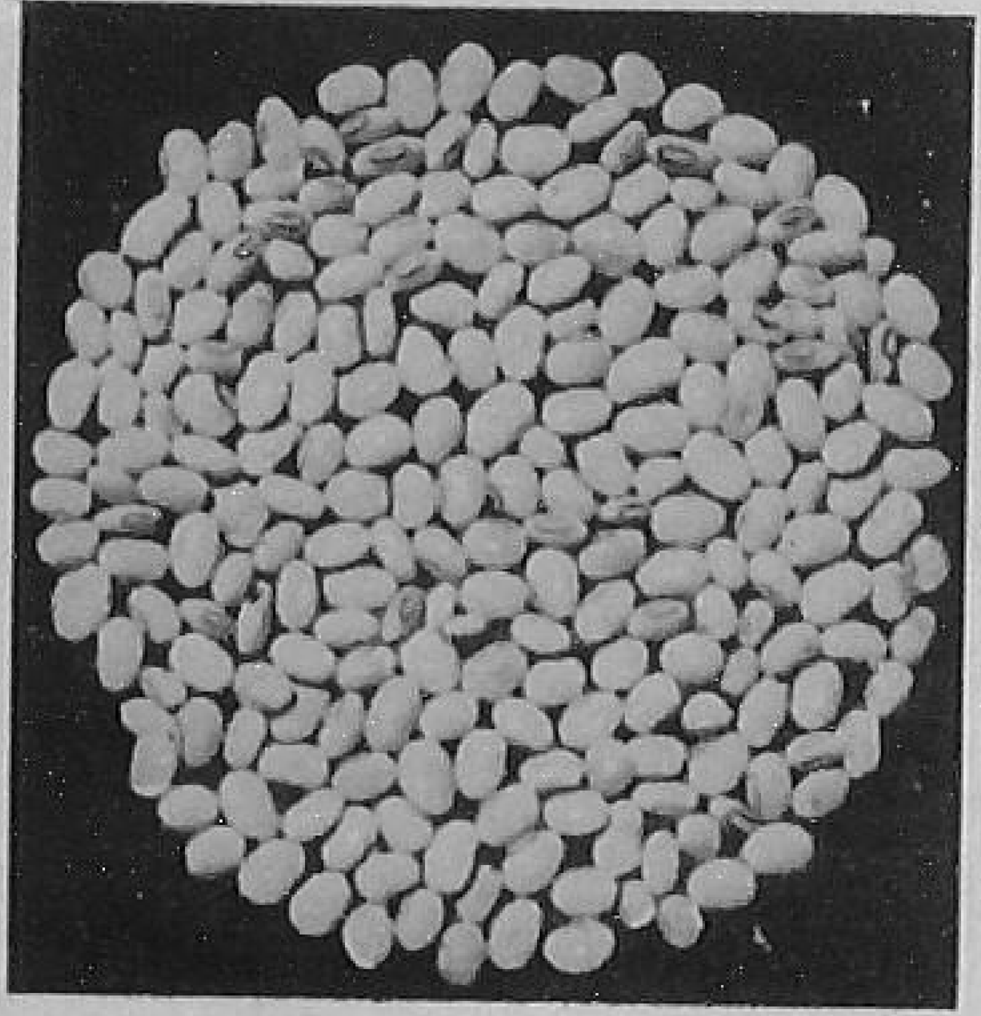
In 1947, seeds of 24 American varieties were received. These varieties, which took 70 days to mature, were grown for two years, and ultimately five varieties, *viz.*, Palmetto, Monetta, Clemson, Creole and Charlee were selected for final test, in which Monetta produced the

Soybean?

NUTRITIOUS AND PAYING

by
P.C. Raheja

highest yield of seed. The other varieties did not give significantly higher yield of fodder. The average yield of ten maunds of seed is quite remunerative for a crop that hardly takes 2¼ months to mature. Besides, about 18



Seeds of local Yellow

to 20 maunds of hay is also produced, which can be mixed with *bhusa* and fed to milch stock. These selections proved better than the long duration (145 to 160 days) varieties selected earlier at Pusa.

In the Punjab, about 90 varieties were tested for shattering and yield during 1947-50. Of these, Behrun was found to be non-shattering. But the Punjab selection No. 1 gave a yield of 34 maunds per acre. It is yellow-seeded, and of bold grain type, and cooks easily. The seed is not bitter and contains 43 per cent protein and 20 per cent oil.

CULTIVATION

For preparing the seed-bed, invert the soil with a furrow-turning plough and remove the stubble of the preceding *rabi* crop. The land should then be given at least four ploughings with the *desi* plough or *bhakkar* to break up the soil. When the land is heavy, the clods can be broken by repeated rolling or planking when they are still somewhat wet. A cloddy field should be avoided for sowing soybean, as it is highly susceptible to water-logging.

Sowing. It is done after the rains set in. The sowing period extends from early July to mid-August. The best period is the second fortnight of July. The seed is

A crop of *Monetta*, the variety which yielded the highest in the varietal trials at the Indian Agricultural Research Institute.

drilled in rows two feet apart. An automatic seed drill or Gujrat seed drill can be used. The seed rate is from six to eight seers per acre. Drill the seeds in moist soil at one to two inches depth. After drilling, the seeds should be covered up by lightly planking the soil. Shallow sowing is preferable to deep drilling. In the Punjab, soaking of seed for 12 hours was found to increase the germination from 50 per cent to 80 per cent.

In trials conducted in the U.S.A., it was found that the germination percentage decreased with deeper sowing. In order to obtain higher yields it is essential to have high germination. The seed, therefore, should not be sown deep. In other countries, however, the drilled seeds are covered up by a chain harrow.

As with other legumes, soybean seeds must be treated with inoculum of bacteria. It helps in the quick growth of the crop. This inoculum is available from the Chemistry Division of the Indian Agricultural Research Institute, New Delhi, and from agricultural chemists in the various States.

For inoculation of soil, prepare muddy-milk by mixing milk and the soil containing bacteria. About half a seer of milk and four ounces of bacterial culture are mixed together. This is sufficient to treat about 20 pounds of seed. Better allow this mixture to stand for about six to twelve hours before treating the seed. Sprinkle it over the seeds and mix by turning and stirring. Spread the beans out in the shade to dry. Do not dry in sun. After drying, sow the seed in the soil. Soybean yields 10 to 40 per cent more when inoculated with bacterial culture.

Fertilizer application. A good crop of soybean yielding about 22 maunds per acre requires 128 pounds nitrogen, 44 pounds phosphorus and 81 pounds potassium. Soybean requirement of nitrogen is high because the protein content is approximately 40 per cent of the seed weight. No doubt, some of this nitrogen is fixed by the crop through the agency of nodule bacteria, yet it is essential to apply nitrogenous fertilizers to get good yields.

Experiments conducted at the Indian Agricultural Research Institute and in foreign countries show that a dressing of 40 pounds nitrogen and 40 pounds phosphoric acid per acre gives good results. In terms of fertilizers, this amounts to 200 pounds ammonium sulphate and 250 pounds superphosphate. Where soil is deficient in potash, application of 50 to 100 pounds of muriate of potash enhances the yield.

Apply only one-third of the dose together with superphosphate and muriate of potash, if required, at the time of sowing. Do not broadcast the fertilizer ; better drill it on the side of the seed line. The rest of the nitrogen should be applied when the crop is in the mid-bloom stage. This helps in heavy seed setting.

About five to six tons, *i.e.*, 10 to 12 cartloads of farmyard manure can also be applied. Sludge manure is supposed to be better than farmyard manure, because it contains more nitrogen, phosphorus and potash in a quickly absorbable state. A three-ton dose is enough.

Thinning and inter-culture. When the crop has germinated in lines, it is intercultured by a bullock-drawn Akola hoe, *triphally* or five-tyned cultivator. The crop is very sensitive to aeration and lack of it adversely affects growth. It should be thinned so as to provide 12 inches spacing between plants. Weeding in between the plants is as essential as the inter-culture in between the rows. Three inter-cultivations and one or two weedings are adequate for the crop.

The crop sown in the middle of July should be ridged up after six weeks' growth. This earthing-up is helpful in draining out the excess rain water and promotes aeration of plant roots which readily develop in the ridged earth.

Irrigation. The short-duration varieties recently selected will not require any irrigation unless the rains fail. In areas where rainfall is less than 20 inches and where rains cease in early September, the crops can be given one more irrigation. This should be in the third week of September when pod formation is in progress. This is the critical period for the crop.

DISEASES AND PESTS

Mosaic. Often the leaves of soybean start turning yellow in the fields. The disease is caused by a virus, and is carried from one plant to another by insect pests. Uprooting of plants which show symptoms of this disease immediately after germination usually reduces future infection.

Downy mildew. In very wet weather, downy mildew is observed on the leaves. Grayish-brown to dark-brown lesions or spots surrounded by chlorotic margins and grayish masses of conidiophores (spores) appear on the under surface of lesions. The loss caused is usually not very serious. Spraying with "Perenox" or Bordeaux mixture helps control the disease.

Pod borers. The green pod borer, *Heliothis armigera*, sometimes infests the crop seriously. It is the caterpillar which feeds on the green pods and causes serious damage. Another caterpillar which does damage is the army worm, *Laphygma frugiperda*. These

can be controlled by application of BHC or DDT under expert advice.

Leaf hoppers. These are found more frequently during dry years and attack the crop from the very early stages of growth. These sucking insects probably cause yellowing of leaves by transferring diseases from one plant to another. *Empoasca fabae* is one such leaf hopper. These can be kept under check by spraying with DDT or BHC under expert supervision.

SEED VIABILITY

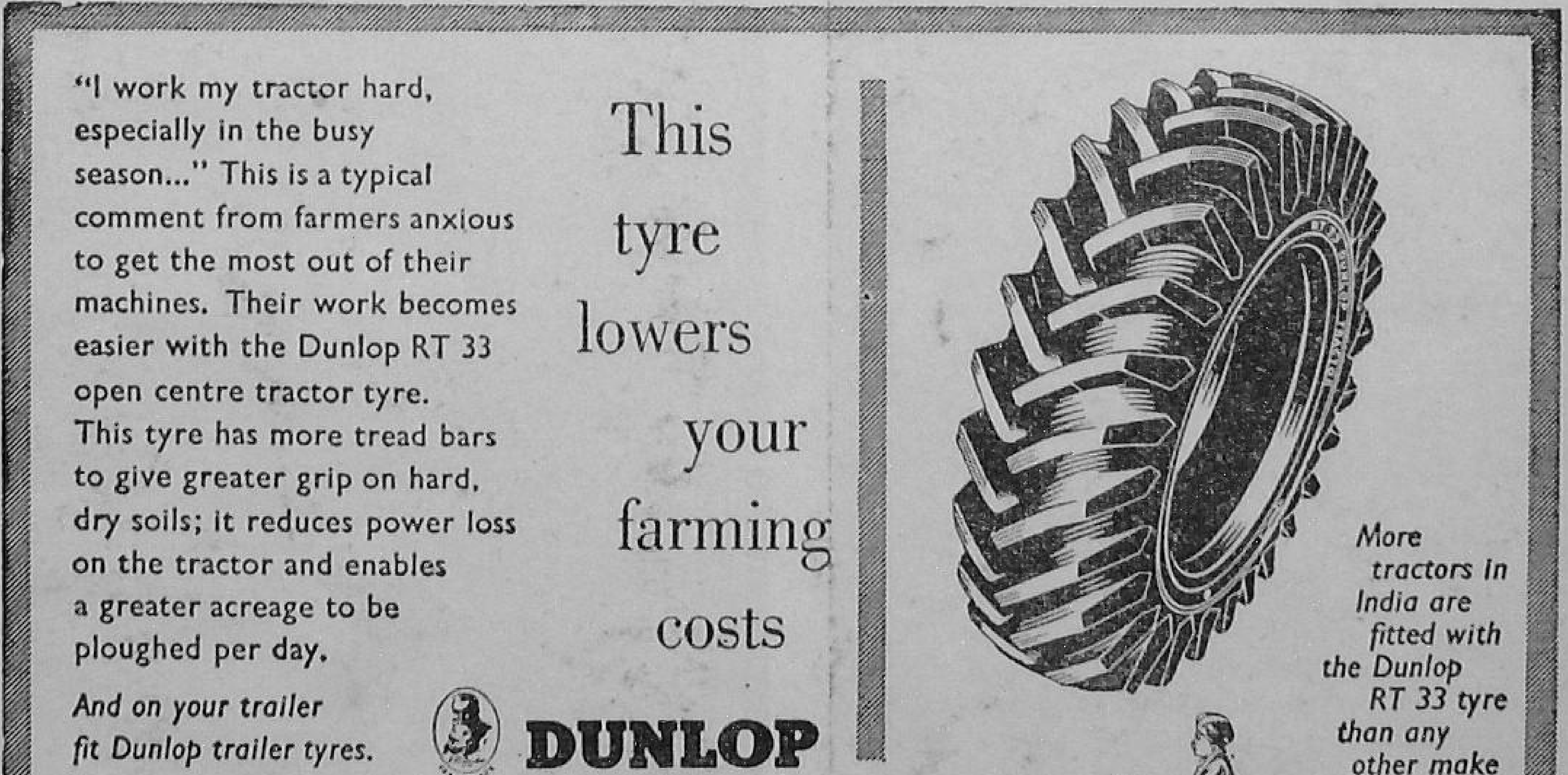
The viability of soybean seeds is low. After three years, their germination capacity rapidly falls off. High moisture content and high temperatures both decrease the longevity. Seeds containing more than 13.5 per cent moisture rapidly deteriorate in germination. They fail to germinate after eight to ten months' storage. Therefore, beans should be carefully dried before being stored. They should be stored in dry and cool places free of insects. The godown should be disinfected prior to storage.

Soybean is ordinarily grown mixed with maize. Often it is planted in alternate rows with maize. The distance between rows is 12 inches. The plant-to-plant distance for maize should be 12 inches and for soybean six to eight inches in the drilled rows. Though the yield of maize grain is reduced, the extra yield of soybean more than compensates for the loss. As both the crops require large amounts of plant food, 400 pounds of ammonium sulphate and 300 pounds of superphosphate should be added to the soil. Apply half the nitrogen at the flowering stage of the two crops.

Grow only those varieties which mature at the same time. We recommend N.P. 2 (Yellow) maize along with Clemson variety of soybean for mixed crop. The former takes about 110 to 120 days and the latter about 70 to 75 days to mature. The two can be harvested separately.

A crop mixture of maize and soybean can be advantageously used for fodder. In the U.S.A., both are cut and left in the field and the animals are let loose to feed on these. This practice is known as soiling. This helps cut on the cost of transport of fodder and further handling. The cattle consume the mixed fodder on the land and enrich it with their dung. Sometimes, for soilage, Sudan grass or *jowar* are also sown mixed with soybean.

(*To be continued*)



New Madras Cottons Yield More And Better

by
L. Neelakantan
Cotton Specialist, Coimbatore

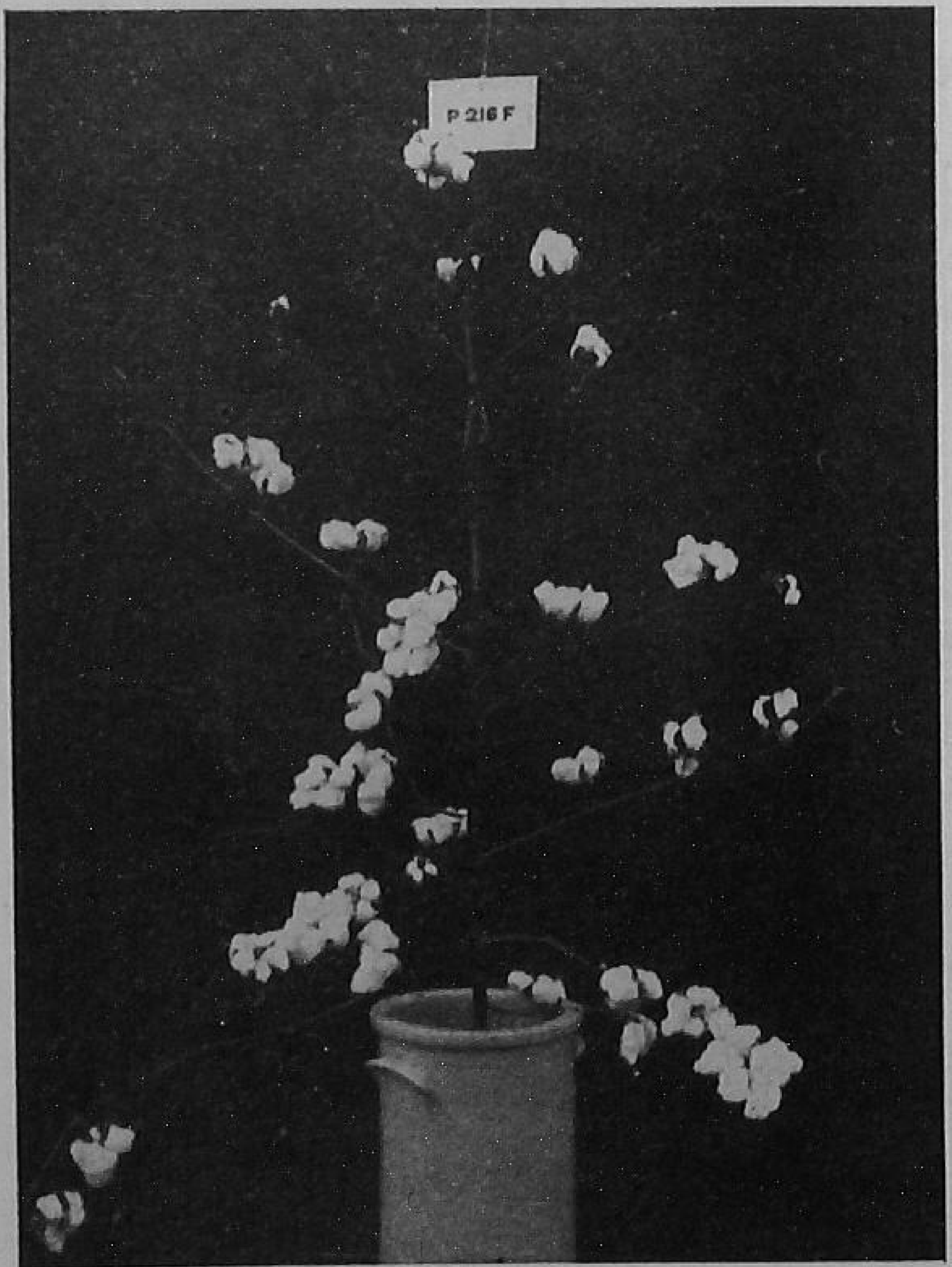
THE last 50 years are of great significance in the history of cotton research in Madras. As a result of continuous breeding and testing, better strains are now available which not only yield more but also produce better quality cotton.

Barring the Nilgiris and Kanya Kumari, all the other ten districts of Madras grow cotton, the most important cotton areas being Coimbatore in the central districts and Thirunelveli in the southern districts. The total area under cotton is about ten lakh acres, of which more than 60 per cent is under *desi* varieties.

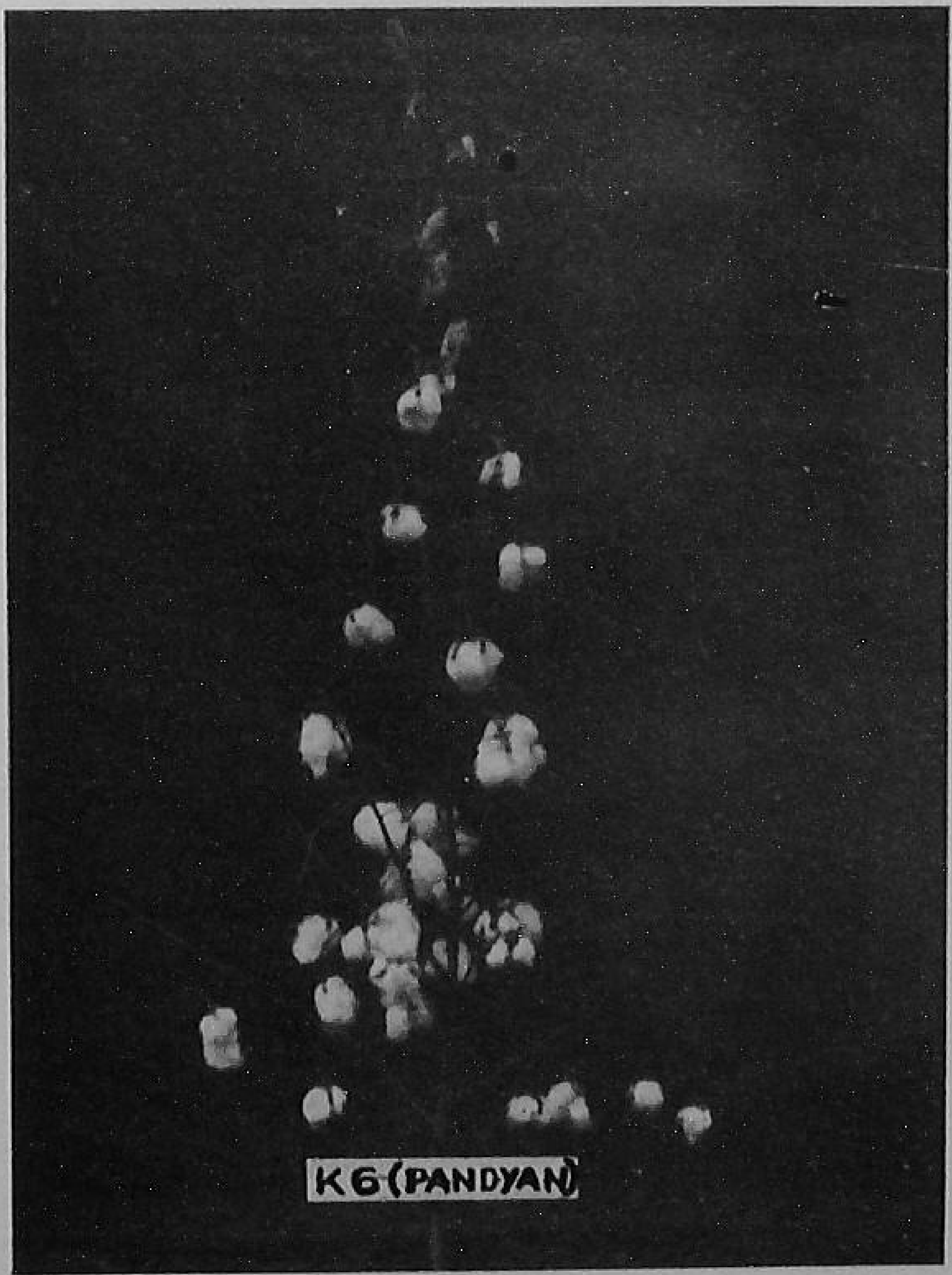
Two varieties of cotton are commonly grown in Madras. One is an indigenous variety belonging to the species *arboreum* and goes by the name Karunganni. The other is an American variety introduced from Indo-China in the first decade of this century. It belongs to the species *hirsutum* and is locally known as Cambodia Uganda (CU).

Before the breeding programme was initiated, Karunganni produced 80 pounds of lint per acre. The staple was about a little more than half an inch and the cotton rarely spun more than 25's. Today Karunganni

P. 216-F, one of the successful varieties introduced from outside the state



Karunganni-6, (Pandyan) the latest and the best

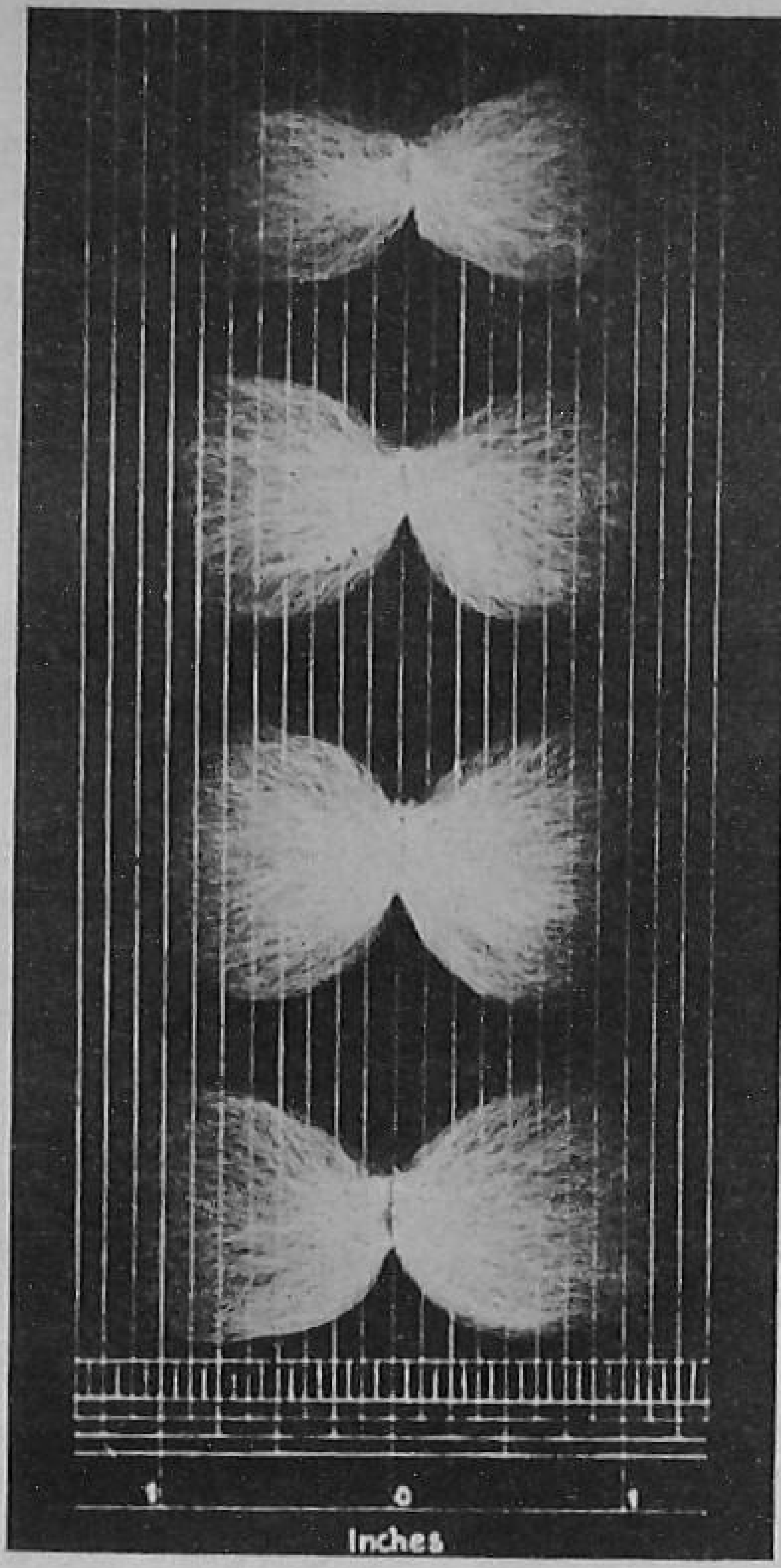


Local

Karunganni-2

Karunganni-5

K-6 (Pandyan)



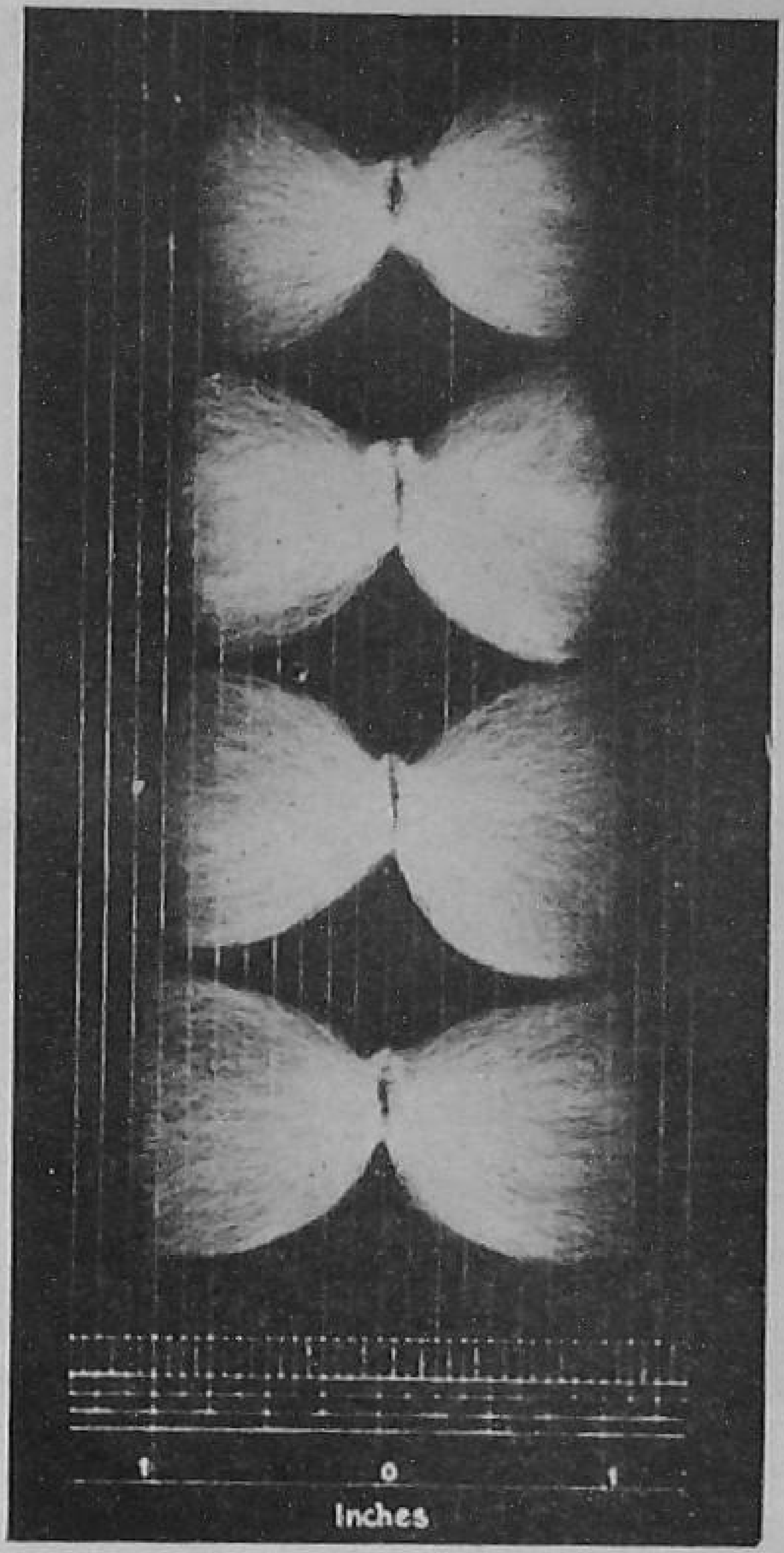
Improved *desi* cottons

Local

Cambodia-2

Madras Cambodia Uganda-1

Madras Cambodia Uganda-2



Improved American cottons

yields 100 pounds of lint per acre, with a staple of a little more than an inch and capable of spinning 30's to 35's. Cambodia in those days yielded 200 pounds of lint per acre with a staple of about three-fourths of an inch and spinning 30's ; today it yields 300 pounds under irrigation, with a staple of about $1\frac{1}{16}$ inch and spins over 40's. This upward trend in yield and quality has been rendered possible by the release of newer and better strains of these varieties. Work on improving the yield and quality of Cambodia and Karunganni was intensified from 1920 at the Cotton Breeding Station, Coimbatore, and at the Agricultural Research Station, Koilpatti, respectively.

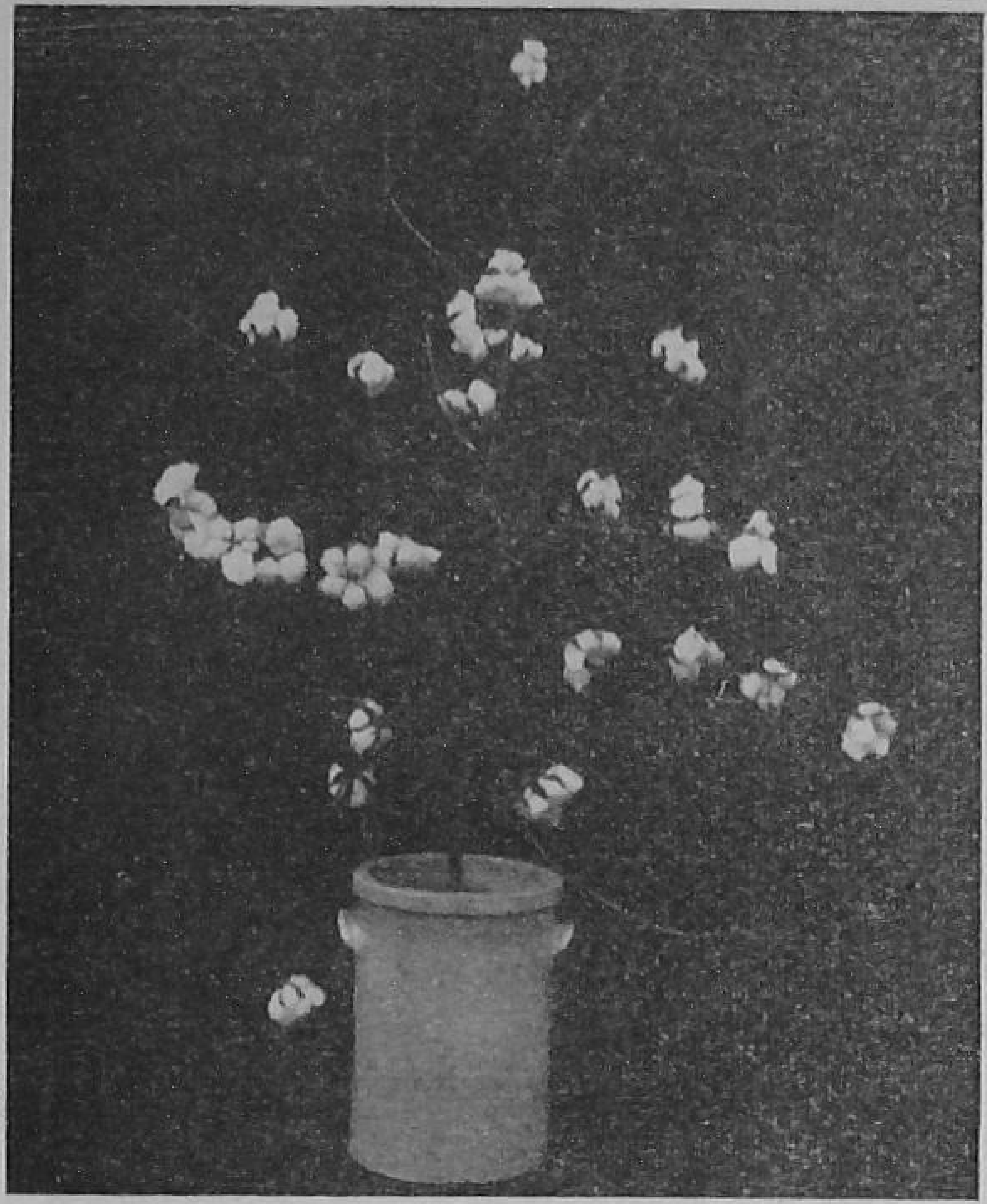
TEN STRAINS DISTRIBUTED

About ten strains have been distributed for general cultivation since then. Among the five Karunganni strains, Karunganni-2 and Karunganni-5 are now under extensive cultivation and have covered about 80 per cent of the total area of six lakh acres under *desi* varieties. Multiplication and distribution of seed of these cottons are being attended to under special schemes functioning at Koilpatti for K-2 and Thiruppur for K-5, respectively.

The latest and the best in yield and quality among the Karunganni strains is Karunganni-6 (Pandyan), evolved at Koilpatti in 1954. It yields 20 pounds of lint per acre and is capable of spinning 35's. It has a greater adaptability range than Karunganni-2 and Karunganni-5 and is intended to replace both. Arrangements are under way to multiply the seed of this strain.

Among the five Cambodian strains, two superior quality cottons, Madras Cambodia Uganda-1 and Madras Cambodia Uganda-2, are already under extensive cultivation. Because of their quality, they have been exempted from price control. A special scheme functioning at Rajapalayam ensures that the quality standards of these cottons delivered to traders are maintained by issuing appropriate certificates based on inspection of the crop at all stages. Seed multiplication schemes for Madras Cambodia Uganda-1 and Madras Cambodia Uganda-2 are functioning at Thiruppur. Distribution of seeds of the latter is done largely by the Uganda Cotton Growers' Marketing Society Ltd., Srivilliputtur, on a co-operative basis.

A new strain, 9030-G, evolved at Coimbatore and intended to replace Madras Cambodia Uganda-1 is awaiting release. It has long staple and is finer than the latter. It yields 380 pounds of lint per acre and is



9030-G, a long-staple strain

capable of spinning 50's. It was evolved in 1958 and is intended to cover four lakh acres. Greater tolerance to jassid and stem-weevil and ability to defoliate at a later stage than Madras Cambodia Uganda-1 are some of the characteristics of 9030-G.

STRAINS FROM OUTSIDE

Among recent successful introductions of extra-State origin are P. 216-F (the short duration Punjab American) for the rice fallows in Tanjore ; Moco (Perennial cotton from Brazil) for homestead cultivation, primarily for handspinning needs ; and Andrews—a variety of the world-famous group of Sea Island Cottons.

Further research to evolve longer, finer and stronger-linted strains in *arboreum* and strains resistant to pests, diseases and drought in American cottons has been intensified in recent years. Attempts are being made to transfer valuable traits of this kind in wild cottons, of which about nine are maintained at the Cotton Breeding Station, Coimbatore, on to cultivated races of Cambodia and Karunganni. *Anomalum*, one of the wild types noted for strength and fineness is already exhibiting its good qualities in a number of advanced generation derivatives of hybrids between *arboreum* strains and *Anomalum*. It is hoped to develop new strains of *arboreum* with still finer and stronger lint, retaining all the good agronomic features of its agronomic base already fixed by several generations of cultivation.

Cotton production in Madras State in the beginning of the First Five Year Plan was round about two lakh bales. At the close of the Plan it rose to about three lakh bales. The target for the Second Five Year Plan has been fixed at 4.5 lakh bales. The production for 1957-58 was 3.8 lakh bales. While most of the production in the pre-Plan period was of medium staple cotton, about two-thirds of the production now is of the long staple category. The total requirement of all grades of raw cotton for the State has been estimated at eight lakh bales. With an intensification in the efforts to replace all the present cottons by the new variety and the adoption of more remunerative cultivation practices, Madras can hope to acquire self-sufficiency in raw cotton for the textile and khadi industries in the next ten to 15 years.

Cotton Crop Failures in The Punjab

THE repeated failures of the cotton crop in the Punjab in recent years have baffled scientists and growers alike. They have been attributed so far to late rains in September-October, when the crop is fully grown with well-developed bolls about to mature and burst.

A Sub-Committee was appointed by the Indian Central Cotton Committee and the Indian Council of Agricultural Research to study the problem. The Sub-Committee has found that in the districts of Gurdaspur, Amritsar, Ferozepur, parts of Ludhiana, Sangrur, Patiala, Karnal, Hissar, etc., the water table has been steadily rising, with resultant poor aeration of the soil and low quality and yield of the crop. Severe jassid attacks have made matters worse. Under such conditions of water-logging and late rains, growers have tended increasingly to give up American cotton in favour of *desi* varieties.

The Sub-Committee is of the opinion that the Punjab Department of Agriculture should demarcate such water-logged areas and discourage the growing of cotton there. It has also recommended early completion of the drainage project, lest worsening of the water-logging may endanger not only cotton but other crops as well, and help in the spread of human diseases. Another recommendation is that cotton breeders in the Punjab should try to evolve early-maturing and jassid-resistant varieties which could also tolerate late rains.

The mice that ate iron

(A TALE FROM THE PANCHATANTRA)

NATUKA was a merchant who lost all his money and left home to do business in a foreign country. Before he left, he went to his friend Lakshman and said: 'Please keep this pair of scales for me until I return. I do not wish to sell it, because it has been in the family for many years.' Then he departed.

In a short time, Natuka made a lot of money and returned to his native city. Going to Lakshman, he said: 'Thank you for keeping my scales. May I have them back now?'

'Your scales have been eaten up by mice,' replied his friend.

'How can mice devour such a huge pair of scales?' cried Natuka angrily. 'It weighed 250 seers.'

'There are a great many mice in my house. Surely 250 seers are not too much for so many of them.'

Natuka began to think. 'Well,' he said with a smile, 'it's not your fault. It's just my bad luck. Now, I want to go and bathe in the river. Will you please send your son with me to carry my bathing things?' Lakshman could not refuse this simple request.

On their way back from the river, Natuka thrust the boy into a cave and blocked the entrance with a great rock. He then returned to Lakshman's house. 'Where is my boy?' asked Lakshman.

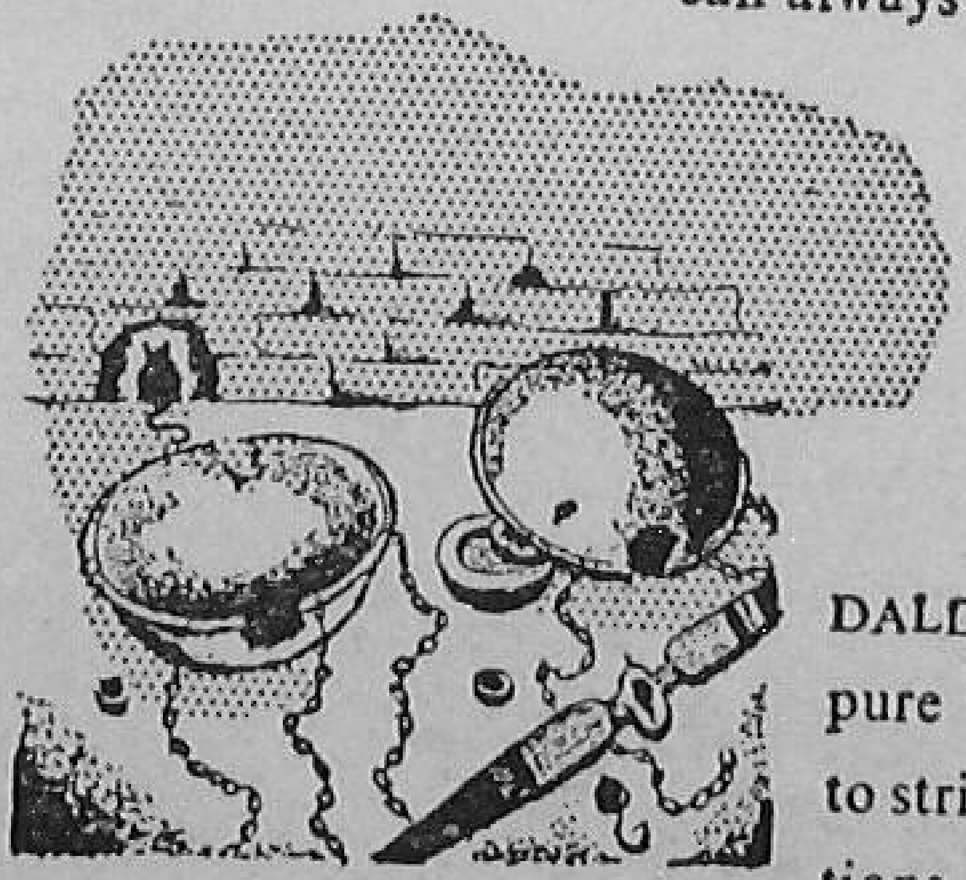
'A great hawk swooped down and carried him off from the river bank," explained Natuka slyly.

'You liar! How can a hawk carry off a fifteen-year old boy?'

'If mice can eat iron scales weighing 250 seers, surely a hawk can carry off a boy of fifteen. Listen to me, Lakshman! If you want your son, give me my scales.'

Natuka got his scales.

MORAL: Whoever has Truth on his side can always expose a falsehood. Take Vanaspati for instance.



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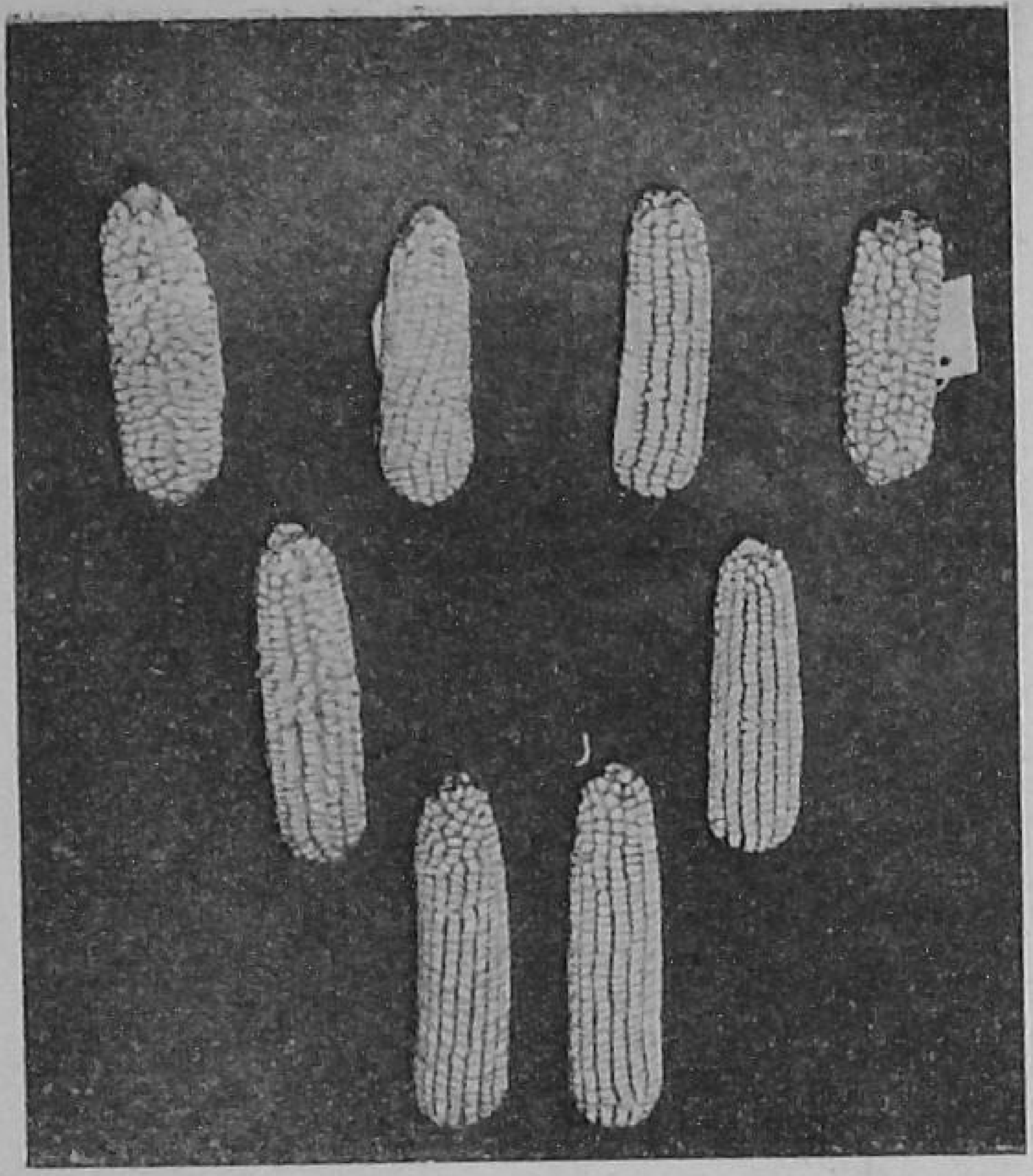


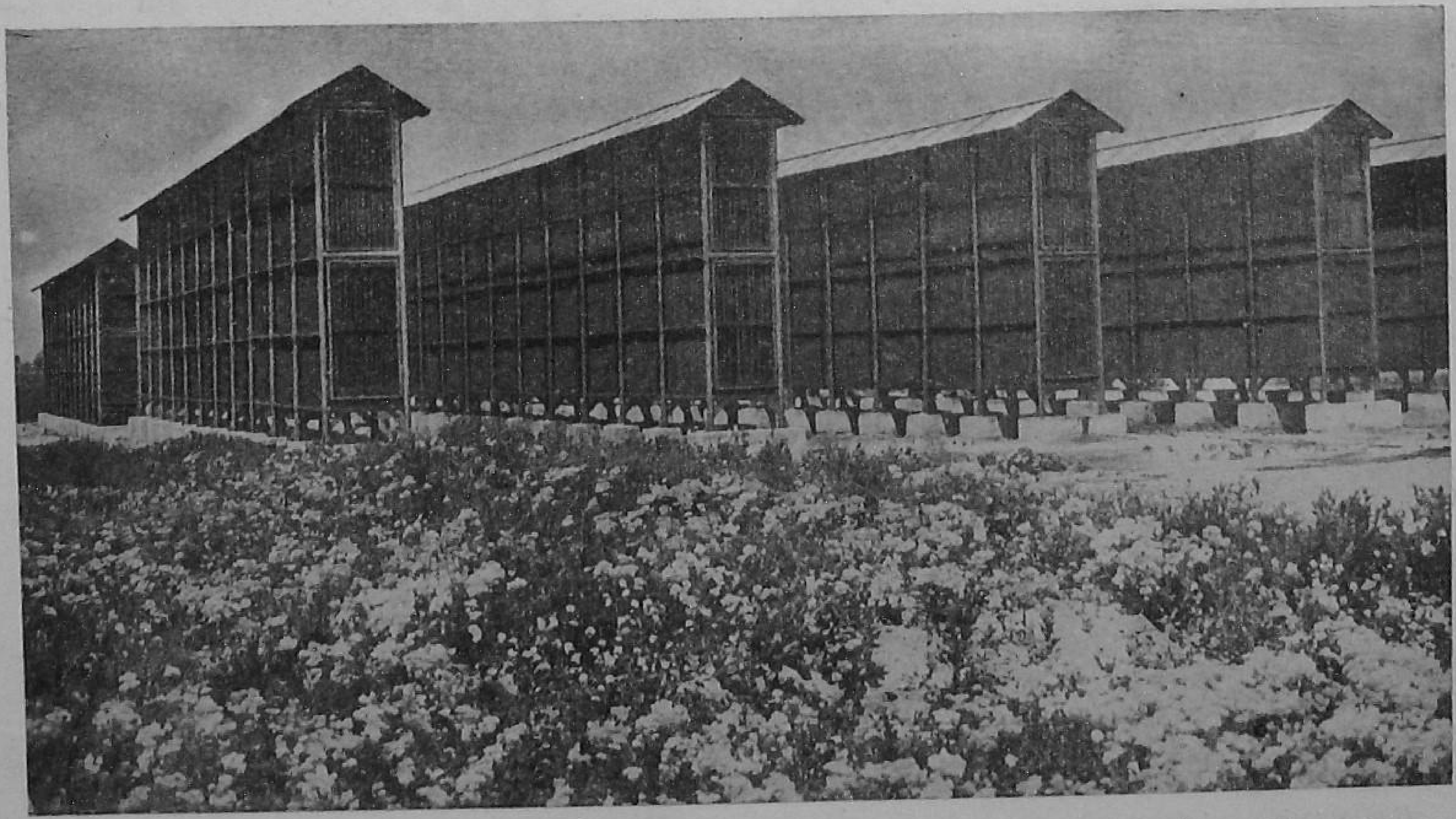
Four grand-parents, parents and children of a doubl linear corn hybrid

FIVE years ago, a farmer, Juraj Králik of the Youth Village in the Komárno district visited Engineer Karol Fajtik, Chief of the Research Station for Corn growing at Topolniky. He brought back with him, not only some valuable information relating to the latest in corn research, but also some high-class heterous corn seeds. With these seeds, the Youth Village's Unified Agricultural Co-operative obtained a maximum corn grain yield of 62.5 quintals per hectare the next year.

Following the example of Králik, other co-operatives and state farms in the Slovak and Bohemian regions have started growing the new hybrid varieties and are reaping rich harvests.

This year, Králik again visited the Topolniky Research Station. During all these five years, the work at the centre had increased manifold and it bore a new look. The experimental plot of about five hectares was divided into hundreds of small square or rectangular plots which were sown with a number of corn varieties,

New metal-frame drying-kilns at the Corn Research Institute at Topolniky



...zechoslovakia's Record Corn Yields

by

Jakub Milko

like the *Slovak Yellow*, *Valtice*, *Bohemian Horse-tooth*, *Hodomin Horse-tooth*, *Slovak White-pearl*, and others. Sown in other green strips were corn varieties from abroad, such as the *Moldau hybrid No. 5*, the *Krasnodarsk hybrid No. 4*, and about 30 other Soviet varieties of corn hybrids, side by side with Polish, Hungarian, Bulgarian, Rumanian, American, and other corn varieties from the corn-growing countries of various continents. There were 120 corn varieties and hybrids from all over the world being tested at the Station. Besides, the station possessed more than 300 hybrids of its own.

A double linear hybrid has been recently issued by the Topolniky Station. It gives 20 per cent higher yield and is expected to play a major role in stepping up corn production in the country. The development of this hybrid will account for an increase amounting to 10,000 carloads a year in Slovakia alone. Each grain of corn grown in the Topolnice experimental fields, is therefore worth its weight in gold, for each trainload of this rare produce is equivalent to carloads of meat, fats, and milk. The improved seeds are multiplied by more than 70 state-farm husbandries and Unified Agricultural Co-operatives of the corn-growing areas of Slovakia, and are expected to be sufficient to sow 130,000 hectares next spring.

The chief and his colleagues at work in a corn field

The size of the radicle and shoot of each sprouted grain are carefully measured in the laboratory

The Topolniky researchers are cultivating the medium-early double-linear hybrid, as well as its late variety which is useful in the production of corn silage. They are working on the production of new hybrids combining the good qualities of the varieties under cultivation. The researchers of the Topolniky Institute do not confine themselves to the four walls of their Institute, and, just as the farmers come to see them, they themselves go in person to the co-operatives and state farms to instruct the producers, to attend the advisory meetings and conferences, and to disseminate their knowledge among the tillers of the soil.

Harvesting Groundnut The Easy Way

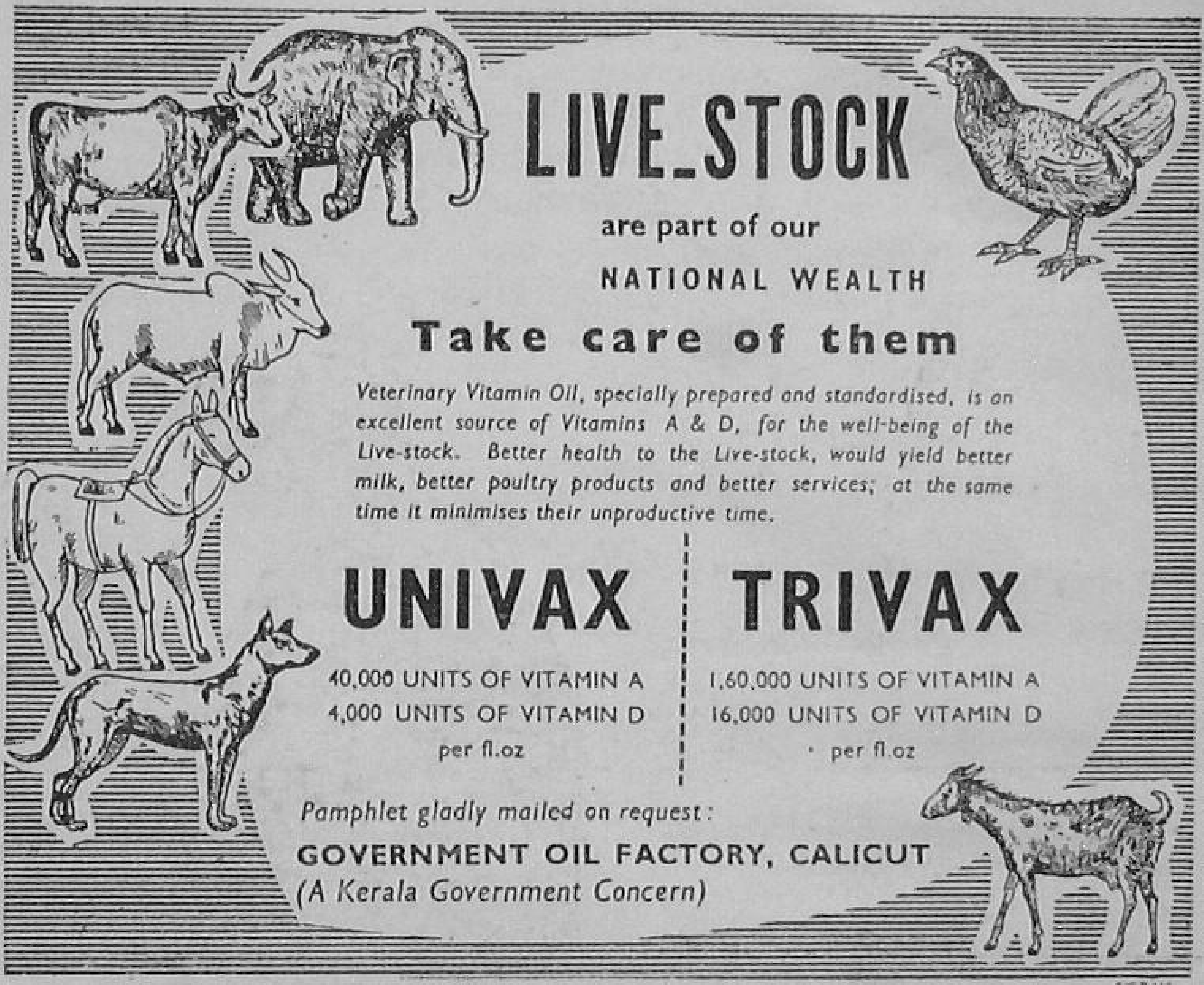
GROUNDNUT is usually harvested by digging out with manual labour, which is not only tiresome but also involves considerable expenditure to farmers.

An easy and simple method of harvesting that has been tried during the current season in a field near Yelwala village in Mysore Taluk, is described below.

On account of drought prevailing in the area, manual digging was not possible. A stone roller was therefore first passed over the crop which was ready for harvest. This helped considerably in breaking the ridges. An Eureka plough was then worked over, which turned up the entire crop, and the groundnuts were collected. The soil was sandy loam in structure. The stone roller could cover nearly three acres per day and the Eureka plough about three-fourths of an acre per day.

This method not only helps harvest groundnut quickly but also improves the tilth of the soil which normally is done by a second operation.

—**Syed Nasiruddin**
Co-operative Farming Society,
Hunsur, Mysore



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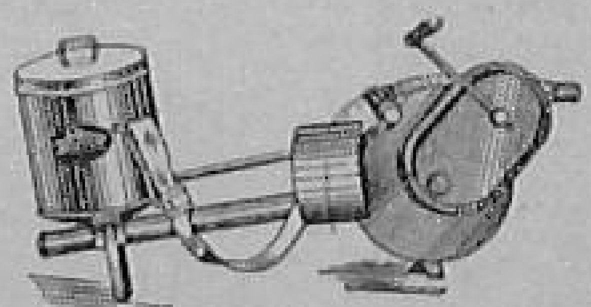

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In north India, nearly 50 to 80 per cent of apples drop off during development, but the percentage has been reduced to 10 to 15 per cent through the use of hormones like 2,4-D.

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Make sure that new-born calves get their proper supply of colostrum (the milk produced just after birth) from the mother. Not only is colostrum a good laxative, but it also confers immunity against diseases.

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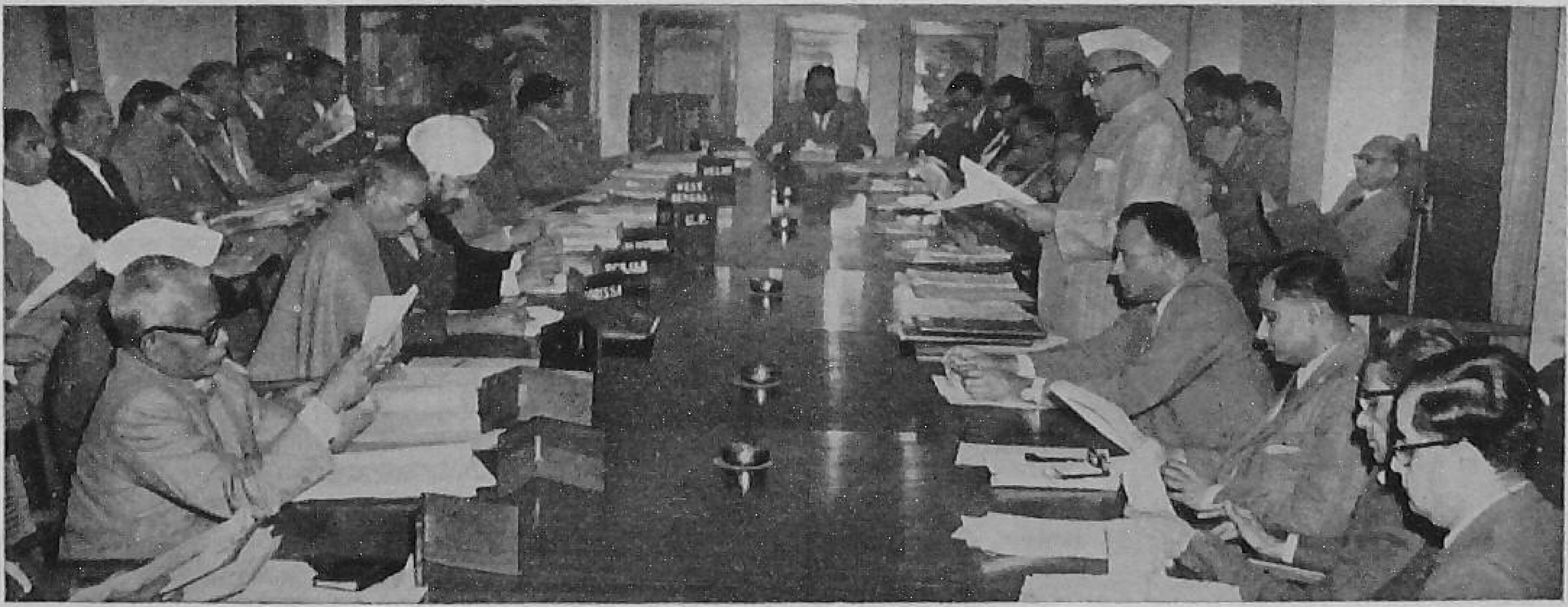
NEWS IN PICTURES

The President, Dr. Rajendra Prasad, inaugurating the 11th meeting of the International Federation of Agricultural Producers at the Vigyan Bhawan, in Delhi on November 27. Mr. James Patton, President, I.F.A.P., is also seen in the photograph

•

His Imperial Highness Meridazmach Asfa Wossen, Crown Prince of Ethiopia, at the Agricultural Research Institute, New Delhi, inspecting some improved varieties of wheat

Shri S. K. Patil, Union Minister for Food and Agriculture, addressing the 9th Convocation of the Indian Institute of Agricultural Research Statistics (ICAR) at New Delhi on November 26



Dr. Panjabrao S. Deshmukh, Union Minister for Agriculture, addressing the meeting of State Agriculture Ministers in New Delhi

Shri S. K. Patil awarding a gold medal to a successful trainee of the Indian Institute of Agricultural Research Statistics

CONTINUED FROM PAGE 21

Russian Rams And Bucks For India

Sheep Breeding Farm, Poona.

KUIBISHOV

This breed comes from the Engels Collective Farms of Kuibishov region. It is a hornless variety. The animals are very large, their body weight being as high as 120 kilograms. This is, in reality, a mutton-type sheep. The wool quality is good but not as fine as in the other breeds. The average annual yield is 7.4 kilograms. The length of the fibre is as much as 15 centimetres. The rams received have been allotted to the Sheep Breeding Farm, Ootacamund, Madras, where trials will be made for the upgrading of mutton-types of sheep.

ANGORA BUCKS

These animals are from Uzbekistan, which is a dry area. The Russians have a plan to name this breed Uzbekskia, after the area from which they come. The animals yield mohair of a very fine quality, the annual yield of which may go up to four kilograms per head. The bucks have been sent to Himachal Pradesh, where a scheme for upgrading the local goats is already under operation.

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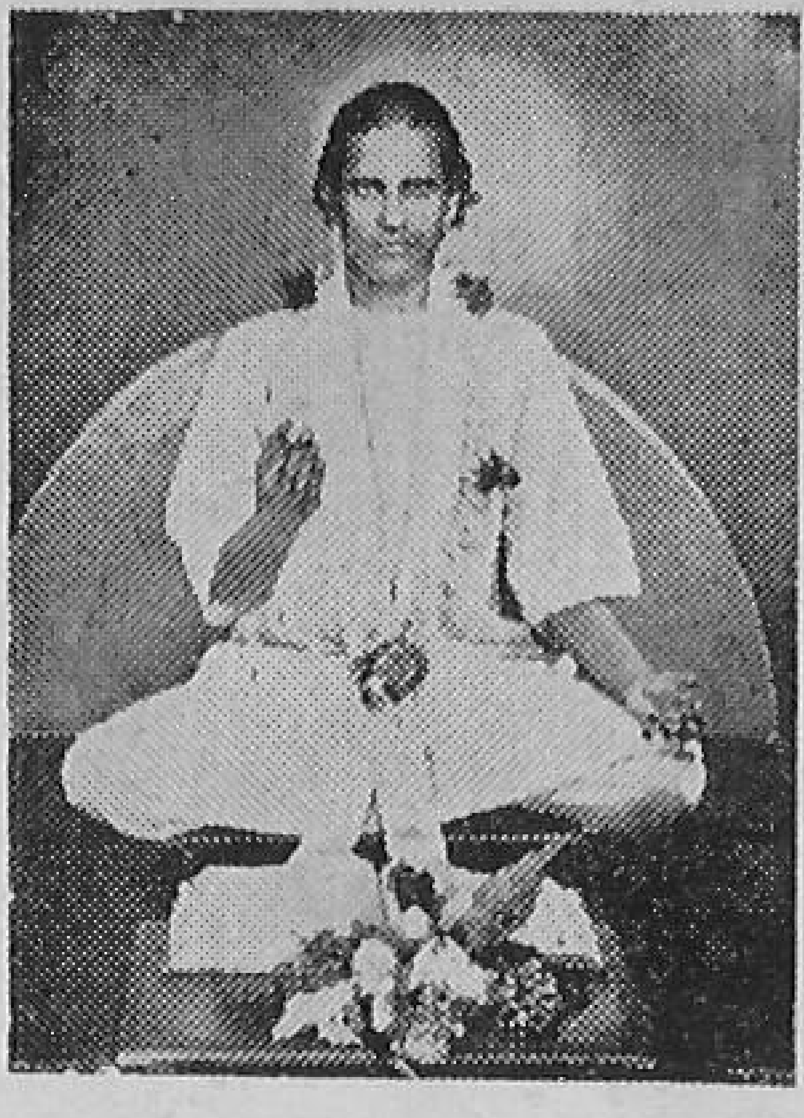

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CONTINUED FROM PAGE 17

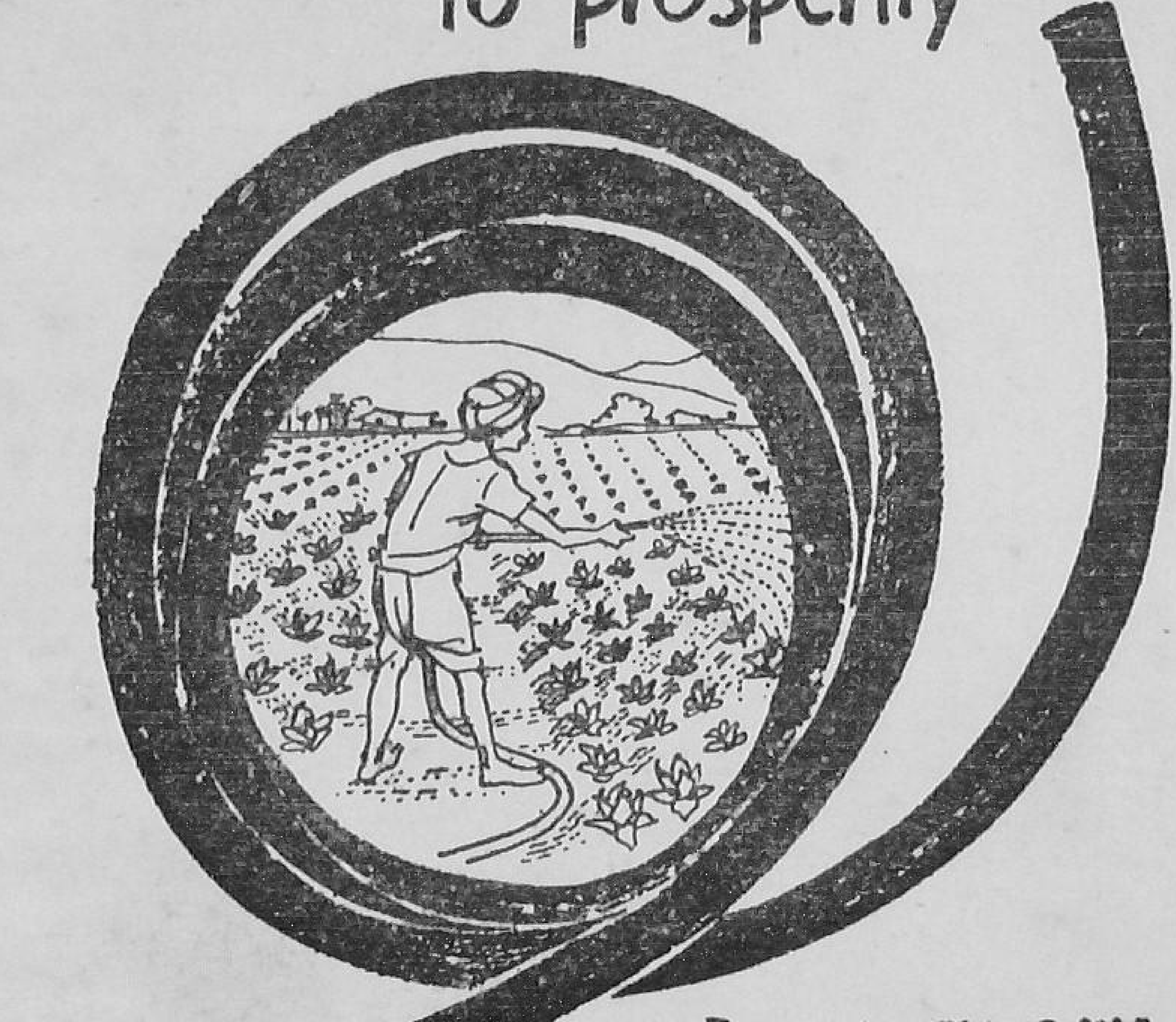
Infectious Diseases of Animals

of the virus and the serum. Extensive research in the United States of America has shown that these losses were due, probably, to the development of variants of the virus which were not affected by the serum.

Other types of immunizing agents against swine fever are also available. There is the vaccine consisting of the virus exposed to the dye, crystal violet; and the vaccine containing the virus attenuated by passage through rabbits, used alone or simultaneously with protective serum. In general, these vaccines are giving favourable results.

It may be clarified that the disease named African swine fever which, as its name implies, occurs in parts of Africa, is different from the swine fever which occurs in other parts of the world. The causal agents are different and the protection against swine fever as carried out in many countries does not protect against the African disease. The African disease appeared recently in Portugal and was eradicated by the adoption of a suitable slaughter policy.

pipeline to prosperity



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